Brüel & Kjær

Measuring Amplifier
Type 2636

Valid from serial no. 1232626

037-0369

MP MASTER
MA25846

Service

Brüel & Kjær

Measuring Amplifier
Type 2636

Valid from serial no. 1232626

037-0389

Service

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Type 2636

Valid from serial no. 1232626

037-0389

Spare Parts

Please state type and serial number of the instrument when ordering spare parts.

Updating

Due to the constant progress in technology the instrument will from time to time be brought up to date in order to provide continuously improved performance.

For this reason there may be small variations between the instrument and the Service Instruction.

However, the local Service Representative is in possession of all informations regarding any change that has been made.

Trouble Shooting

If any fault should occur, check the instrument according to the Checking Procedure.

The Checking Procedure is divided up into sections, where each section will refer to a subsection in the Service Instruction corresponding to a specific part of the instrument.

The subsection in the Service Instruction will normally consist of a Block Diagram, a Technical Description, an Adjustment Procedure and a Simplified Diagram where the test points are identified.

Before correcting any apparent deviation make sure that the measuring instrument has tolerances small enough not to affect the measurement.

When a fault has been traced and corrected, the voltages and adjustments influenced by the correction must be rechecked. The complete instrument should then be tested to make sure that all basic functions are operative.

The tolerances given in these notes are intended for use as guide for adjustments.

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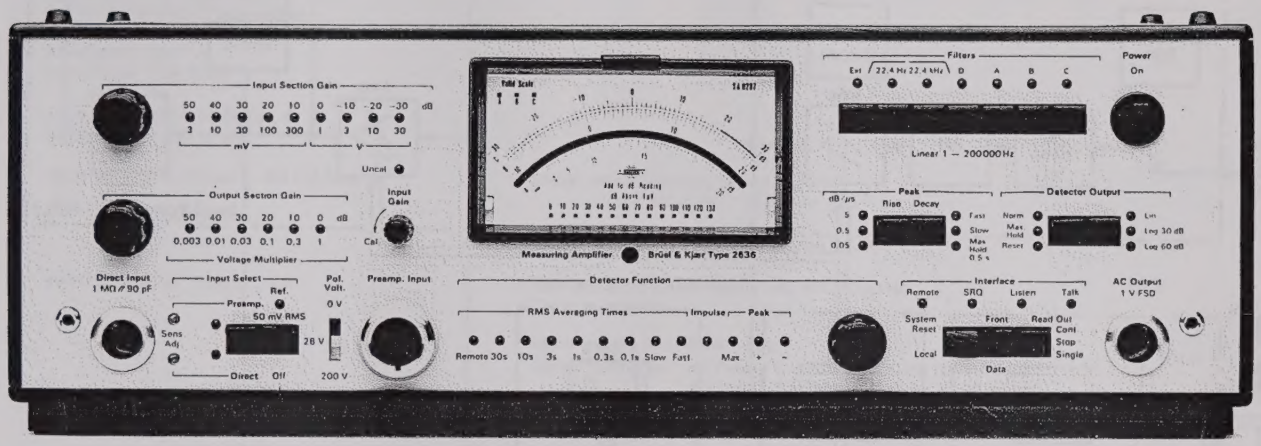
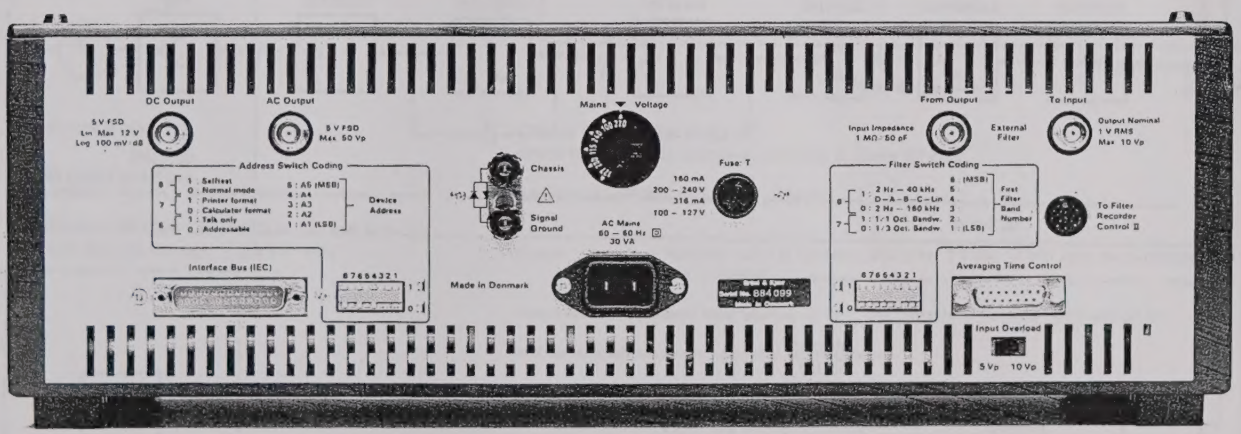
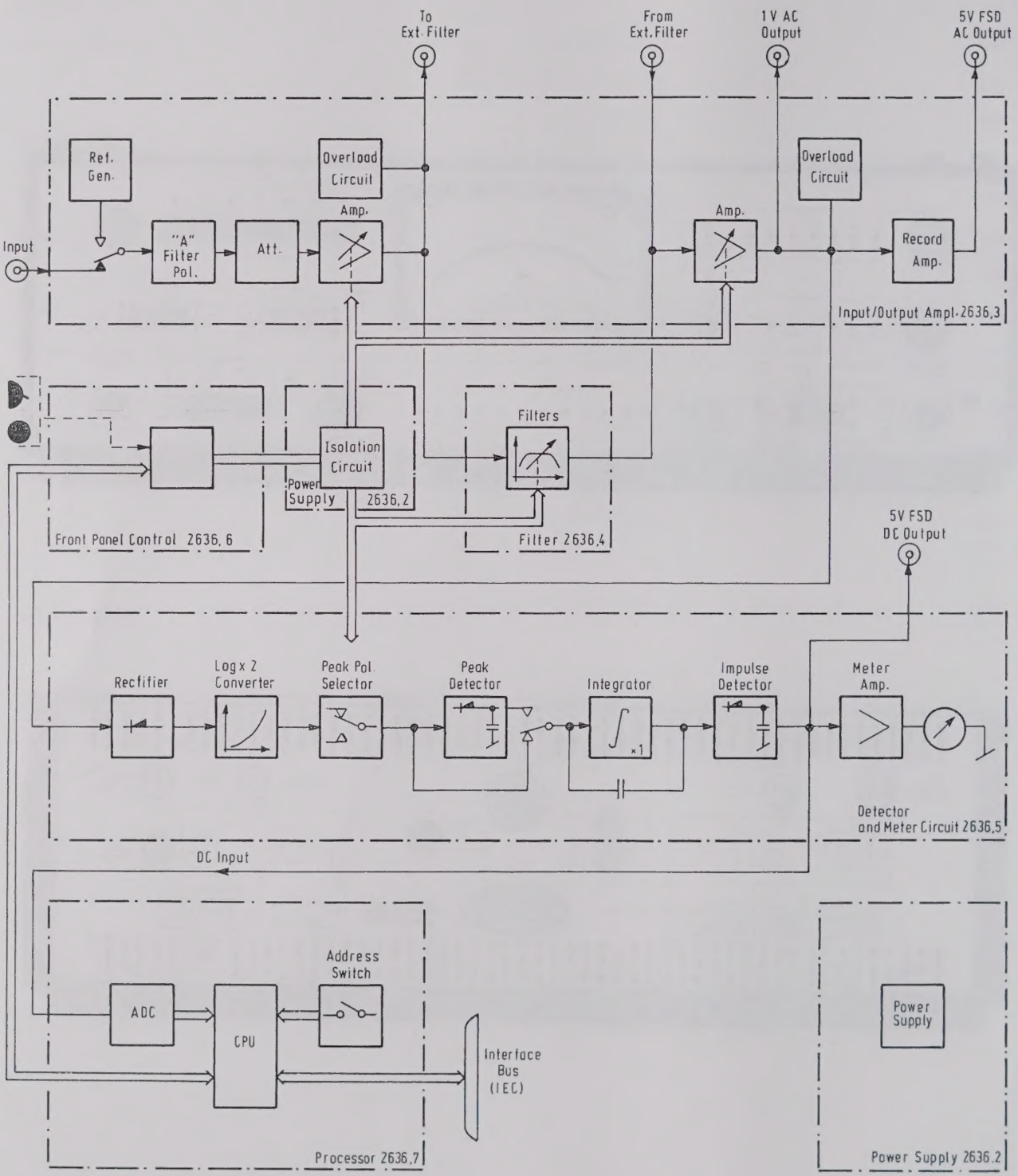

Input Section Gain
50 40 30 20 10 0 -10 -20 -30 dB
3 10 30 100 300 1 3 10 30
mV V
Uncal
Output Section Gain
50 40 30 20 10 0 dB
0.003 0.01 0.03 0.1 0.3 1
Voltage Multiplier
Cal
Input Gain
Direct Input 1 MΩ // 90 pF
Input Select
Ref.
Preamp.
50 mV RMS
26 V
Direct
Off
Pol. Volt.
0 V
200 V
Sens Adj
Preamp. Input
Measuring Amplifier
Brüel & Kjær Type 2636
Detector Function
RMS Averaging Times
Impulse
Peak
Remote 30s 10s 3s 1s 0.3s 0.1s Slow Fast Max + -
Filters
Ext 22.4 Hz 22.4 kHz D A B C
Linear 1 — 200000 Hz
Power
On
Peak
Rise Decay
dB/µs
5
0.5
0.05
Fast
Slow
Max Hold
0.5 s
Detector Output
Norm
Max Hold
Reset
Lin
Log 30 dB
Log 60 dB
Interface
Remote
SRQ
Listen
Talk
System Reset
Local
Front
Read Out
Cont
Stop
Single
Data
AC Output 1 V FSD


DC Output
5 V FSD
Lin Max 12 V
Log 100 mV/dB
AC Output
5 V FSD
Max 50 Vp
Mains Voltage
Chassis
Signal Ground
160 mA
200 – 240 V
315 mA
100 – 127 V
Fuse: T
AC Mains
50 – 60 Hz
30 VA
Made in Denmark
Address Switch Coding
Selftest
Normal mode
Printer format
Calculator format
Talk only
Addressable
A5 (MSB)
A4
A3
A2
A1 (LSB)
Device Address
Interface Bus (IEC)
From Output
Input Impedance 1 MΩ // 50 pF
External Filter
To Input
Output Nominal 1 V RMS
Max 10 Vp
Filter Switch Coding
2 Hz – 40 kHz
D–A–B–C–Lin
2 Hz – 160 kHz
1/1 Oct. Bandw.
1/3 Oct. Bandw.
(MSB)
(LSB)
First Filter Band Number
To Filter Recorder Control
Averaging Time Control
Input Overload
5 Vp 10 Vp


To
Ext. Filter
From
Ext. Filter
1 V AC
Output
5V FSD
AC Output
Ref.
Gen.
Overload
Circuit
Amp.
Overload
Circuit
Amp.
Input
"A"
Filter
Pol.
Att.
Record
Amp.
Input/Output Ampl. 2636,3
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Isolation
Circuit
Power
Supply
2636,2
Front Panel Control 2636,6
Filter 2636,4
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DC Output
Rectifier
Log x 2
Converter
Peak Pol.
Selector
Peak
Detector
Integrator
Impulse
Detector
Meter
Amp.
Detector
and Meter Circuit 2636,5
DC Input
Address
Switch
ADC
CPU
Interface
Bus
(IEC)
Processor 2636,7
Power
Supply
Power Supply 2636,2

1.1 Function Check

Sensitivity

INPUT SECTION GAIN: "100 mV"
OUTPUT SECTION GAIN: "x 1"
INPUT GAIN: "Cal"
INPUT SELECT: "Direct", "Off"
DETECTOR FUNCTION: "Fast"
DETECTOR OUTPUT: "Lin", "Norm"
FILTERS: "Linear 1—200000 Hz"
AC POWER: "On"
Meter Scale: "SA 0259"

ADDRESS SWITCH CODING 8: "0"
(located on the rear panel)

Input signal to "Direct Input": 50 mV, 1000 Hz
Check: Meter indicates 50 mV
If not, adjust "Direct Sens Adj."

INPUT SELECT to "Direct", "50 mV RMS"

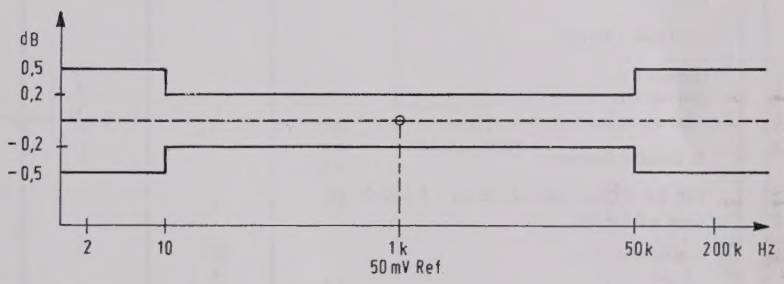
Check: Meter indicates 50 mV
"Input Select Ref" LED is on

In case of malfunction consult Section 2636-3.1

INPUT SELECT to "Direct" "Off"

Input signal to "Direct Input": 100 mV, 1000 Hz
Check as follows:

Meter reading is 100 mV ~ FSD
Output voltage on "AC Output 1 V FSD": 1000 mV ± 40 mV AC
- "AC Output 5 V FSD": 5000 mV ± 200 mV AC
- "DC Output 5 V FSD": 5000 mV ± 100 mV DC
(located on the rear panel)



Frequency Response

Change Input voltage to 50 mV
Check the frequency response according to above scheme

Self Test

Activate INTERFACE READ OUT "Single"

ADDRESS SWITCH CODING 8 to "1" and 6 to "1"
INPUT SELECT: "Direct", "50 mV RMS"

Check: "Interface Remote" LED is flashing, and after 10 sec it will light permanently, indicating the test is started

When test is completed after approx. 3 min, the "Interface Remote" LED will go off

In case of malfunction consult the scheme below

1.2 Error Code Identification

LED and Meter indication	Fault Character	Delay Sec	Tolerances dB	If necessary consult item:
1 Front Panel Controls: Change REMOTE/LOCAL. If no knob change has been done the last 10 sec., the analog test will start				
2 Calibration: Ref: On, A Filter, RMS 0,1 s, Normal, Log 60 dB, 100 mV, 1 Level = 94,0 dB	UNCAL	10	0.2	Function Check 2636-1.1

continued

Function	Fault Character	Delay Sec	Tolerances dB	If necessary consult item:
3 Amplifier Liniarity: Ref: On, A Filter, RMS 0,1 s, Normal, Log 60 dB, Level = 94,0 dB				Input/Output Amplifier
300 mV × 0,3	0	1	0.4	Section 2636 3
1 V × 0.1	1	1	0.4	
3 V × 0.03	2	1	0.4	
10 V × 0.01	3	1	0.4	
30 V × 0.003	4	1	0.4	
4 Detector Liniarity: Ref: On, A Filter. RMS 0,1 s, Normal, Log 60 dB, Level = 94.0 dB				Detector and Meter Circuit
10 V × 1	5	10	1.0	Section 2636 5
3 V × 1	6	1	1.0	
1 V × 1	7	1	0.6	
300 mV × 1	8	1	0.6	
100 mV × 1	9	1	0.6	
30 mV × 1	:	1	0.6	
10 mV × 1	;	1	0.6	
Level 90.0 dB (Overload)				
3 mV × 1	<	1	3.0	
Lin Level = 50 mV				
100 mV × 1	=	1	1.0	
300 mV × 1	>	1	1.0	
1 V × 1	?	1	1.0	
5 Detector Function: Ref: On, A Filter. Normal. 30 mV × 1, Log 60 dB. Level = 97.0 dB				Detector and Meter Circuit Section 2636:5
Peak	@	1	0.5	
Peak	A	1	0.5	
Max Peak	B	1	0.5	
Ref Off. Level = 71,0 dB				Detector and Meter Circuit
Fast Peak Decay	C	0.6	7.0	
Ref On/Off, Slow Peak Decay	D	6	7.0	Section 2636 5
Ref On. Level = 40,0 dB				Front Panel Control
Reset Detector Output	E	1	0.7	Section 2636:6
Ref Off. Normal. Level 97,0 dB				Front Panel Control
Max Hold 0.5 s (level)	F	0.3	0.7	
Level = 40,0 dB (reset)	G	0.75	0.7	Section 2636:6
Ref On/Off. Level 97,0 dB				Detector and Meter Control
Max Hold Detector Output	H	4	0.5	Section 2636 5

continued

Function	Fault Character	Delay Sec	Tolerances dB	If necessary consult item:
Ref On Level = 94.0 dB				
Impulse	I	4	0.5	Detector and Meter circuit
Ref Off, Level = 68,0 dB	J	9	7.0	
Ref On/Off, RMS Fast	K	0,75	7.0	Section 2636 5
Ref On/Off, RMS Slow	L	6	7 0	
Ref On/Off, RMS 0,1 s	M	0,3	7 0	
Ref On/Off, RMS 0,3 s	N	0,9	7 0	
Ref On/Off, RMS 1 s	O	3	7 0	
Ref On/Off, RMS 3 s	P	9	7.0	
Ref On/Off, RMS 10 s, Level = 85,3 dB	Q	10	2 5	
Ref On/Off RMS 30 s	R	30	2 5	
6 Filters:				
Ref On, 30 mV × 1, RMS 0,1 s, Normal Log 60 dB, Level 94.0 dB				Filters
C-filter	S	1	0 5	
B-filter	T	0.5	0.5	Section 2636 4
D-filter	U	0 5	0 5	
LF-filter	V	0 5	0 5	
HP-filter	W	0.5	0 5	
All filters off	X	0 5	0 5	
7 Noise				
Ref Off, 3 mV × 0,003, RMS 0.1 s, Normal, Log 60 dB, Level − 4.0 dB				
Input short circuit to ground (internal)				Filters
A-filter	Y	6	9 9	
C-filter	Z	2	9 9	Section 2636 4
B-filter		2	9 9	
D-filter Level 2 0 dB		2	9 9	
HP- and LP-filter Level —4 0 dB	|	9	9 9	
HP-filter Level 6 5 dB	Λ	3	9 9	
All filters off	—	3	9 9	Input/Output Amplifier Section 2636:3

Self test Description

The Type 2636 contents a built-in self test program which make it possible to check the instrument functions automatically If a Type 2312 is connected to the 2636 the 2312 automatically write, if a fault should occur in the instrument

The self test is activated by setting the DEVICE ADDRESS switch bit 8 to 1 and 2636 is set to Talker function
The self test can be interrupted by pushing the INTERFACE switch to Local

The self test program contents the following steps:

1 Front Panel Controls

Push INTERFACE 'Single
Now the Remote LED starts flashing As long as the "Remote" LED is flashing the knobs at the Front Panel can be checked to see if the function can be set and read by the CPU When none of the Front Panel controls have been touched for 10 s the self test continues to step 2

2 Calibration

The analog test is carried out by using the internal Ref Generator as reference for all the measurements This means that the Direct "Sens Adj" and the "Input Gain" potentiometers influence the measurements Therefore the 2636 first checks if the calibration is correct If not the "Direct" and SRQ LED s are flashing The 2312 will write for inst :

UNCAL
094 4 (measured value)
094 0 (correct value)

After this information the self test will be interrupted

The calibration can be done as follows

REF : "50 mV RMS
INPUT SECTION GAIN: "100 mV"
INPUT GAIN: "Calibrated"
OUTPUT SECTION GAIN "x1
INPUT: "Direct
DETECTOR FUNCTION: RMS 0 1 s
FILTERS: "A"
DETECTOR OUTPUT: "Normal", "Lin"

Adjust 'Sens Adj" to 50 mV Meterdeflection (94 dB re 1 µV) Tolerances ' 0 2 dB

Notice, that "Preamp Sens Adj" is not used in the self test and that the test is carried out in the Log 60 dB Mode

3 Amplifier Linearity

Input and Output Section Gain is changed in —10 dB and + 10 dB steps respectively Therefore the Output Level will be constant and only the Amplifier Linearity will be checked

continued

4. Detector Linearity

Test of the Detector Linearity is done by changing the "Input Section Gain" in 10 dB steps over the hole Dynamic Range both in Logarithmic and Linear Mode

5 Detector Function

The Detector Function test starts with test of the Peak
First the test of the —Peak + Peak and Max Peak and then the test of the Fast and Slow Decay in Max Peak The Decay Time test is made by switching the Ref voltage on and off and measure the value after a certain time
Then a test of the Detector Reset With Reference on, the Detector is reset once
Then a test of the Max Hold 0.5 s This is done by switching the Reference on and off and see if the value is constant for 0.5 s Finally a test of the Max Hold

The Impulse is tested as follows:

First a measurement of the value and then a test of the Decay Time

The last Detector Function check is a check of the RMS Time Constants, which are checked in the same way as in Peak

6 Filters

By using the built in Reference Generator as reference all the Filters can be checked at 1 kHz The Filter Curves are not checked. but the following Noise Check will give a good indication if the curves are correct (If necessary consult Filter, 2636 4)

7. Noise

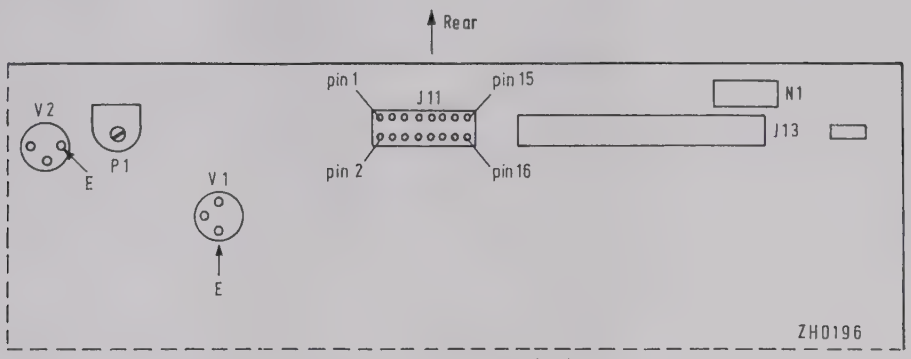
The Noise check is done in all the filters and without the filters The check is possible because both the Inputs can be connected to ground, at the same time. internally The noise value is checked within a certain range in order to find as many fault as possible

Notice If the top cover is removed from the 2636, an error message may be printed by the 2312 because of the increased noise level

After the Noise check the 2636 switches back to Local Mode or to that Remote position which where present before the self test

General

To ensure that fault is not produced by outside signals all connection to the instrument should be removed before a self test takes place (Except the Interface cable and the Mains cable)



Viewed from the printed side

Check the following voltages on the Mother Board ZH 0196:

Emitter V2: + 200 V ± 0,2 V DC (Pol voltage)
If necessary adjust P1

Emitter V1: + 146 V to + 154 V (Unloaded)

J11 pin 4: + 55 V to + 65 V (Unregulated)

J11 pin 6: —55 V to —65 V (Unregulated)

J11 pin 12: + 17,9 V to + 19,3 V

J11 pin 16: —17,9 V to + 19,3 V

J11 pin 14: + 5,75 V to + 6,25 V

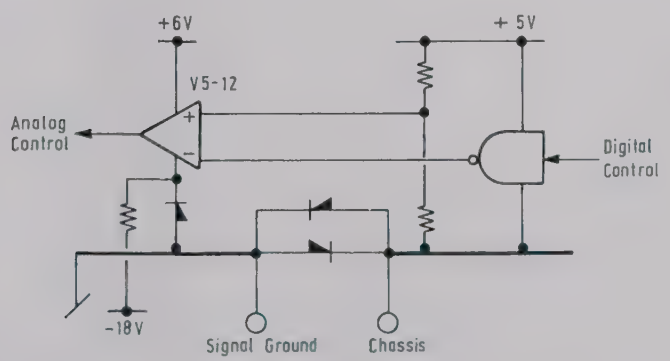
J11 pin 13: + 4,80 V to + 5,20 V

J11 pin 5: + 11,5 V to + 12,5 V (Unloaded)

Print ZL 0066 pin 22: + 14,25 V to + 1575 V

Print ZL 0066 pin 23: —14,25 V to —15,75 V

Notice! Circuit Diagram can be found at the Interconnection Diagram 2636 9



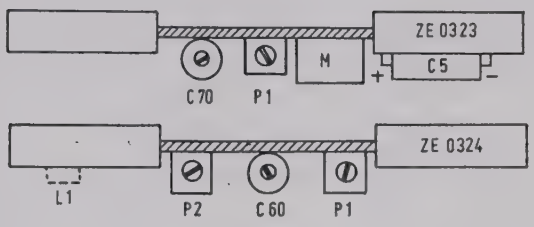
Remarks

Digital ground is always connected to chassis

The Analog Circuits are controlled via isolating components, which make the Analog ground floating corresponding to chassis

This is done in order to avoid Hum in big installations Notice that the Analog Circuits are al-

3.1. Adjustment



Off-set

Measure the voltage at the negative side of C5 on ZE 0323: ± 10 mV.
If necessary adjust P1.

INPUT SECTION GAIN: "30 mV"
OUTPUT SECTION GAIN: "x 0,1"
INPUT SELECT: "Direct, "Off"
INPUT GAIN: "Cal."
FILTERS: "Ext:"
DETECTOR FUNCTION: "Fast"
DETECTOR OUTPUT: "Norm.", "Lin"
Meter Scale: "SA 0259"
Rear: INPUT OVERLOAD: "10 Vp"

Measure the voltage at the negative side of C4 on ZE 0324: ± 10 mV.
If necessary adjust P2.

Frequency Response, Output Section

Input signal to "External Filter, From Output" 1 kHz.
Adjust the input voltage to 1000 mV on "AC Output 1 V FSD"

INPUT SECTION GAIN to "100 mV"
OUTPUT SECTION GAIN to "x 1"

Change the input frequency to 1 Hz.

Check the voltage on "AC Output 1 V FSD": 1000 mV ± 0,5 dB.

Change the input frequency to 200 kHz.

Check the voltage on "AC Output 1 V FSD": 1000 mV + 0,8—0 dB
If necessary adjust L1 on ZE 0324

OUTPUT SECTION GAIN to "x0.1"

Reduce the input voltage by 20 dB
Check 1000 mV + 0,8—0 dB
If necessary adjust C60.

Frequency Response, Input Section

Input signal to "Direct Input" 1 kHz.
Adjust the input voltage to 1000 mV on "AC Output 1 V FSD".

INPUT SECTION GAIN to "1 V"
FILTERS to 'Linear 1 Hz — 200000 Hz"

Change the input frequency to 50 kHz.

Check the voltage on "AC Output 1 V FSD": 1000 mV ± 0,5 dB.
If necessary adjust C70 on ZE 0323.

Overload

Input signal to "Direct Input" 1 kHz.
Adjust the input voltage to 7,42 V on "External Filter, To Input".

FILTERS to "Ext."

Check that the 1 V LED is flashing within ± 0,5 dB

Change the input frequency to 200 kHz.

Check that the 1 V LED is flashing within ± 1 dB.

FILTERS to "Linear 1 Hz — 200000 Hz"
OUTPUT GAIN to "x0.3"

Input signal to "Direct Input" 1 kHz.
Adjust the input voltage to 7,42 V on "AC Output 1 V FSD".

Check that the x0.3 LED is flashing within ± 0,5 dB.
Change input frequency to 200 kHz
Check that the x0.3 LED is flashing within ± 1 dB

Reference Oscillator

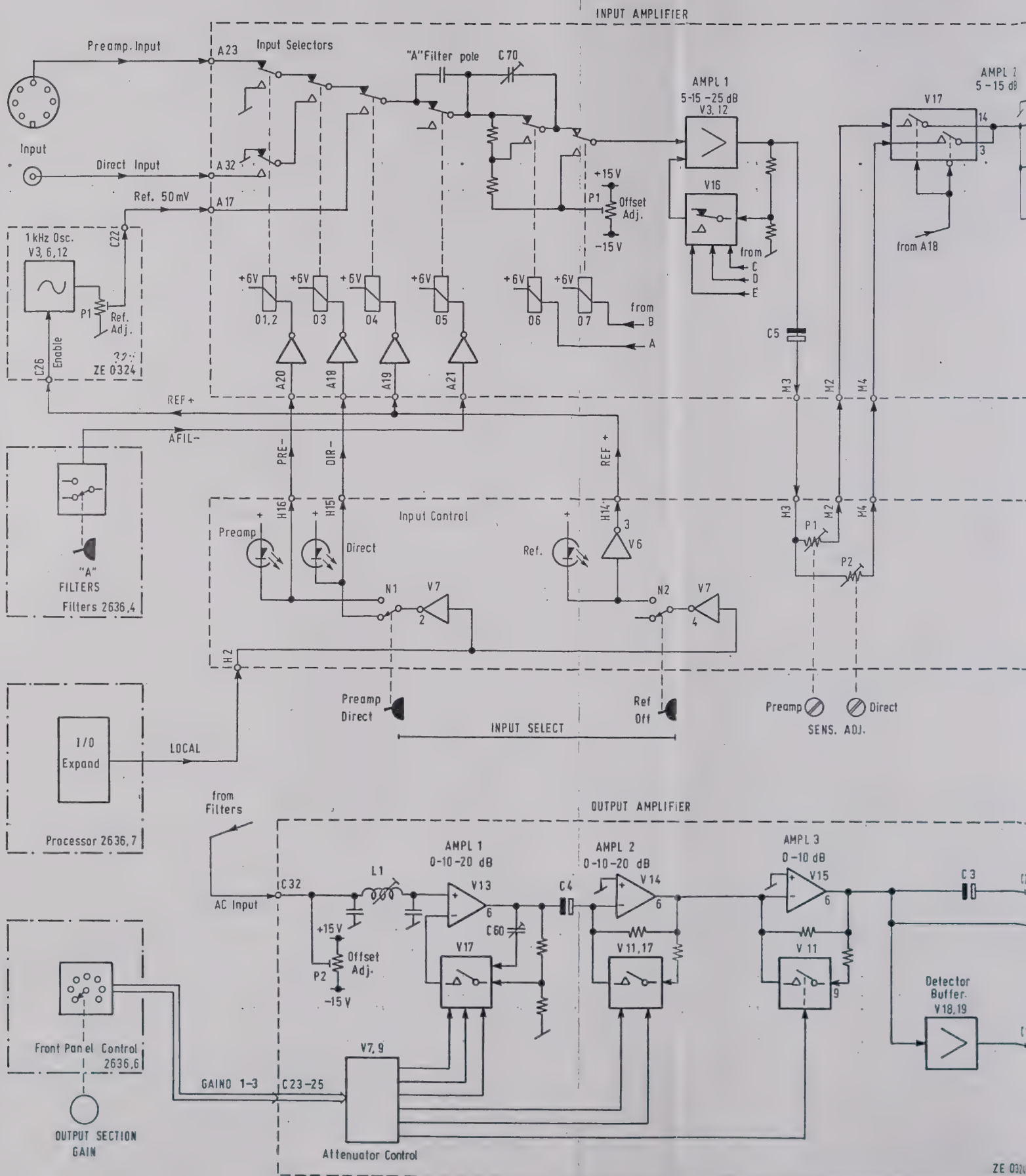
Input signal to "Direct Input" exactly: 100 mV, 1 kHz

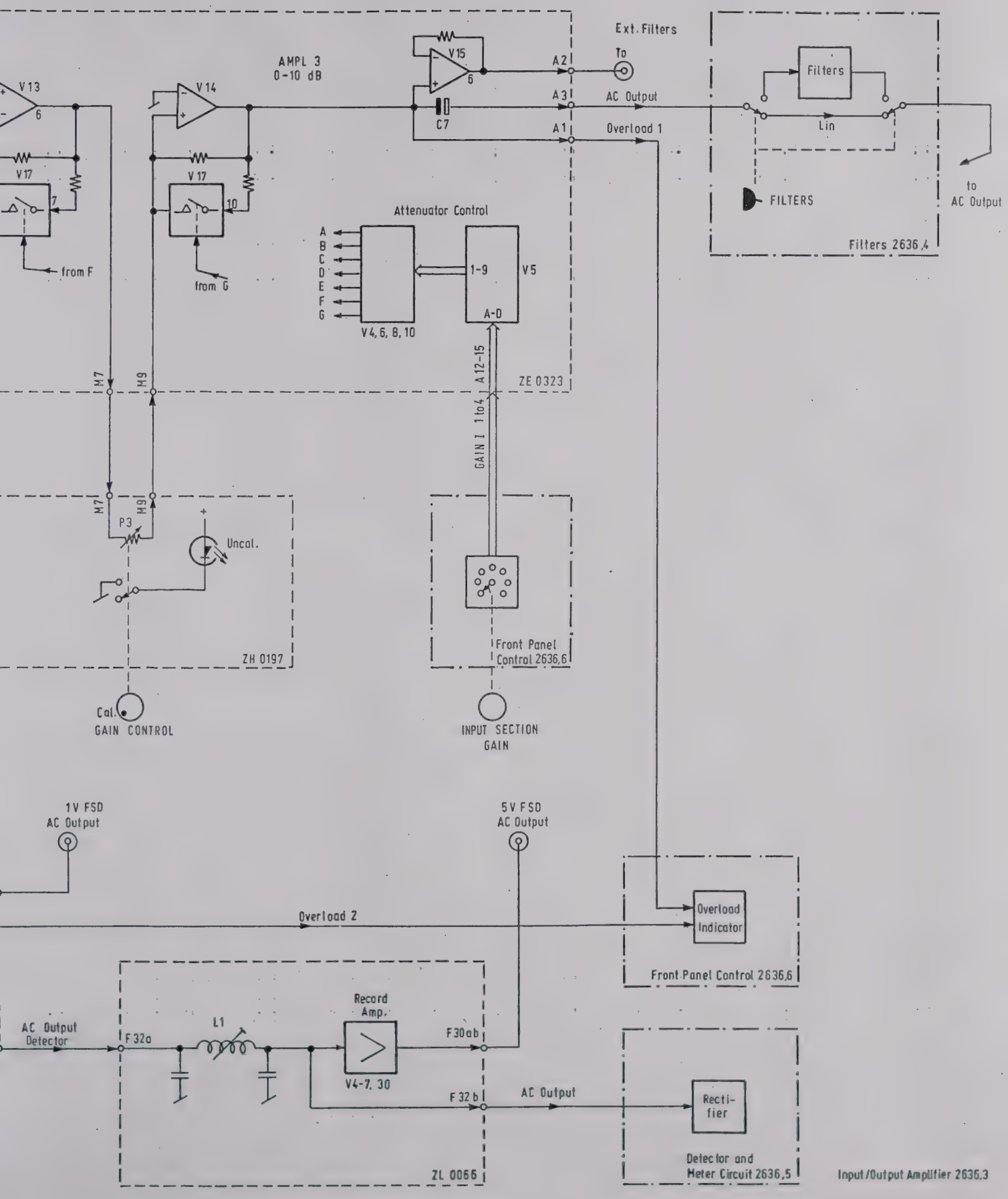
INPUT SECTION GAIN to "100 mV"

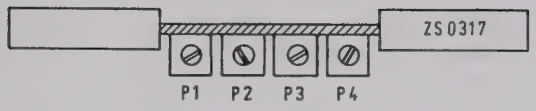
Check that the meter deflect to full scale.
If necessary adjust "Direct Sens. Adj.".

INPUT SELECTOR to "Direct", "50 mV Ref."

Check that the meter deflect to 50 mV.
If necessary adjust P1 on ZE 0324.


INPUT AMPLIFIER
Preamp. Input
Input
Direct Input
Ref. 50mV
A23
Input Selectors
A32
A17
"A" Filter pole
C70
+15V
P1
Offset Adj.
-15V
AMPL 1
5-15 -25 dB
V3, 12
V16
from C
D
E
AMPL 2
5 - 15 dB
V17
14
3
from A18
1 kHz Osc.
V3, 6, 12
C22
P1
Ref. Adj.
C26
Enable
ZE 0324
+6V
01,2
03
04
05
06
07
from B
A
A20
A18
A19
A21
C5
M3
M2
M4
REF+
AFIL-
PRE-
DIR-
REF+
H16
H15
H14
Input Control
Preamp
Direct
Ref.
V6
N1
V7
2
N2
V7
4
P1
P2
"A"
FILTERS
Filters 2636,4
H2
Preamp
Direct
Ref
Off
INPUT SELECT
Preamp
Direct
SENS. ADJ.
I/O Expand
LOCAL
Processor 2636,7
from Filters
OUTPUT AMPLIFIER
AMPL 1
0-10-20 dB
V13
AMPL 2
0-10-20 dB
V14
AMPL 3
0-10 dB
V15
C32
L1
C4
C3
AC Input
+15V
Offset Adj.
P2
-15V
C60
V17
V11,17
V11
9
Detector Buffer
V18,19
Front Panel Control 2636,6
GAIN 1-3
C23-25
V7, 9
OUTPUT SECTION GAIN
Attenuator Control
ZE 0320


AMPL 3
0-10 dB
V13
V14
V15
V17
V17
C7
A2
A3
A1
Ext. Filters
To
AC Output
Overload 1
Filters
Lin
FILTERS
to
AC Output
Filters 2636,4
Attenuator Control
A
B
C
D
E
F
G
1-9
V5
A-D
V4, 6, 8, 10
from F
from G
M7
M9
A12-15
GAIN I 1 to 4
ZE 0323
P3
Uncal.
ZH 0197
Front Panel
Control 2636,6
Cal.
GAIN CONTROL
INPUT SECTION
GAIN
1V FSD
AC Output
5V FSD
AC Output
Overload 2
Overload
Indicator
Front Panel Control 2636,6
AC Output
Detector
F 32a
L1
Record
Amp.
V4-7, 30
F 30ab
F 32b
AC Output
Recti-
fier
Detector and
Meter Circuit 2636,5
ZL 0066



4.1. Adjustments

INPUT SECTION GAIN: "100 mV"
OUTPUT SECTION GAIN: "x1"
INPUT SELECT: "Direct", "Off"
INPUT GAIN: "Cal."
FILTERS: "Linear 1 Hz — 200000 Hz"
DETECTOR FUNCTION: "Fast"
DETECTOR OUTPUT: "Norm.", "Lin"
Meter Scale: "SA 0259"

Input signal to "Direct Input" 100 mV, 1 kHz.

Switch FILTERS to "D".
Deflection on the meter: 100 mV ± 0,05 dB
If necessary adjust P1 (ZS 0317) (A, B, C and D adj.)

Release "D" and switch "A" on.
Deflection: 100 mV ± 0,05 dB.
If necessary adjust P2 (ZS 0317).)

Release "A" and switch "B" on.
Deflection: 100 mV ± 0,05 dB.
If necessary adjust P3 (ZS 0317.)

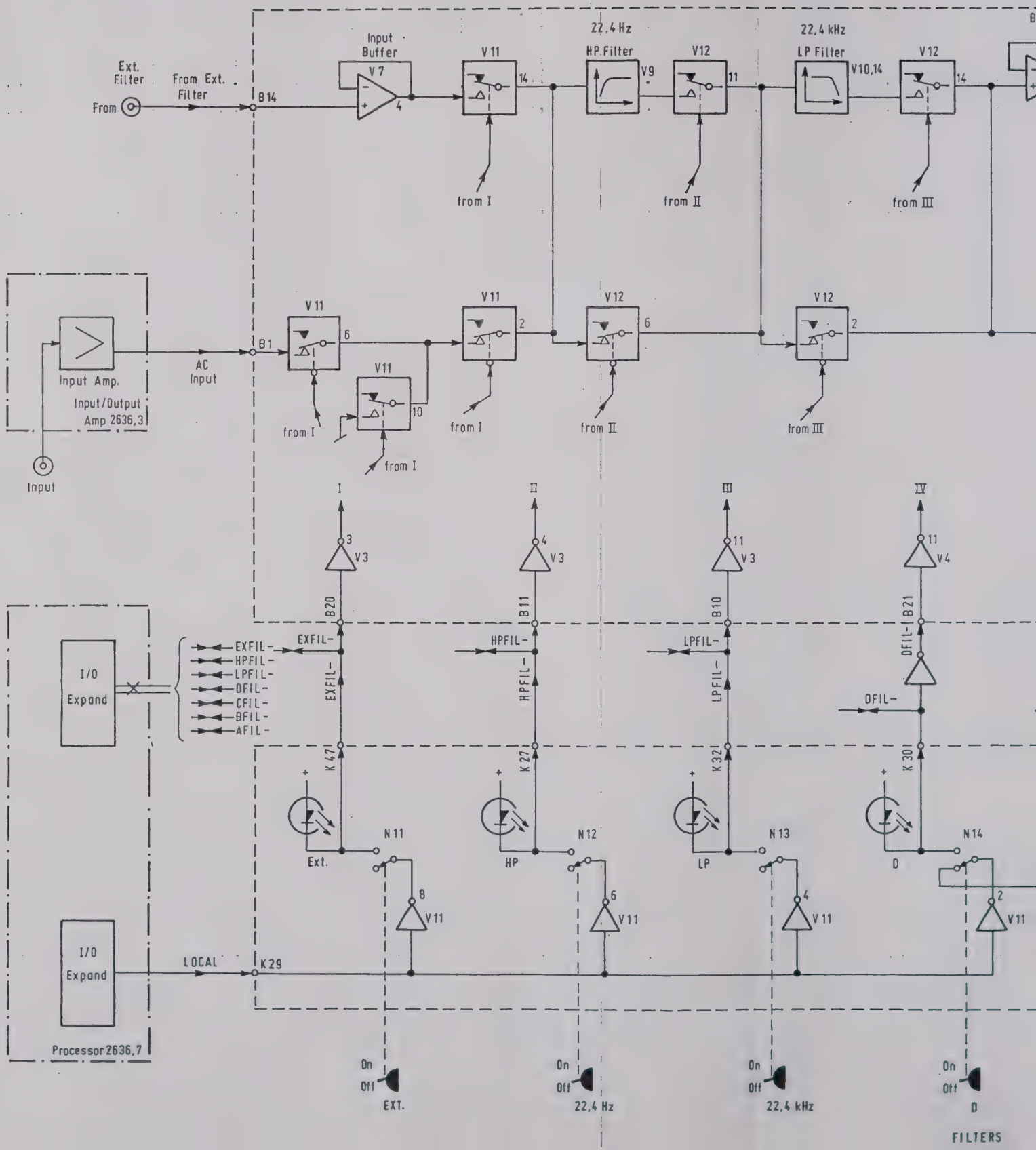
Release "B" and switch "C" on.
Deflection: 100 mV ± 0,05 dB.
If necessary adjust P4 (ZS 0317.)
Release "C".

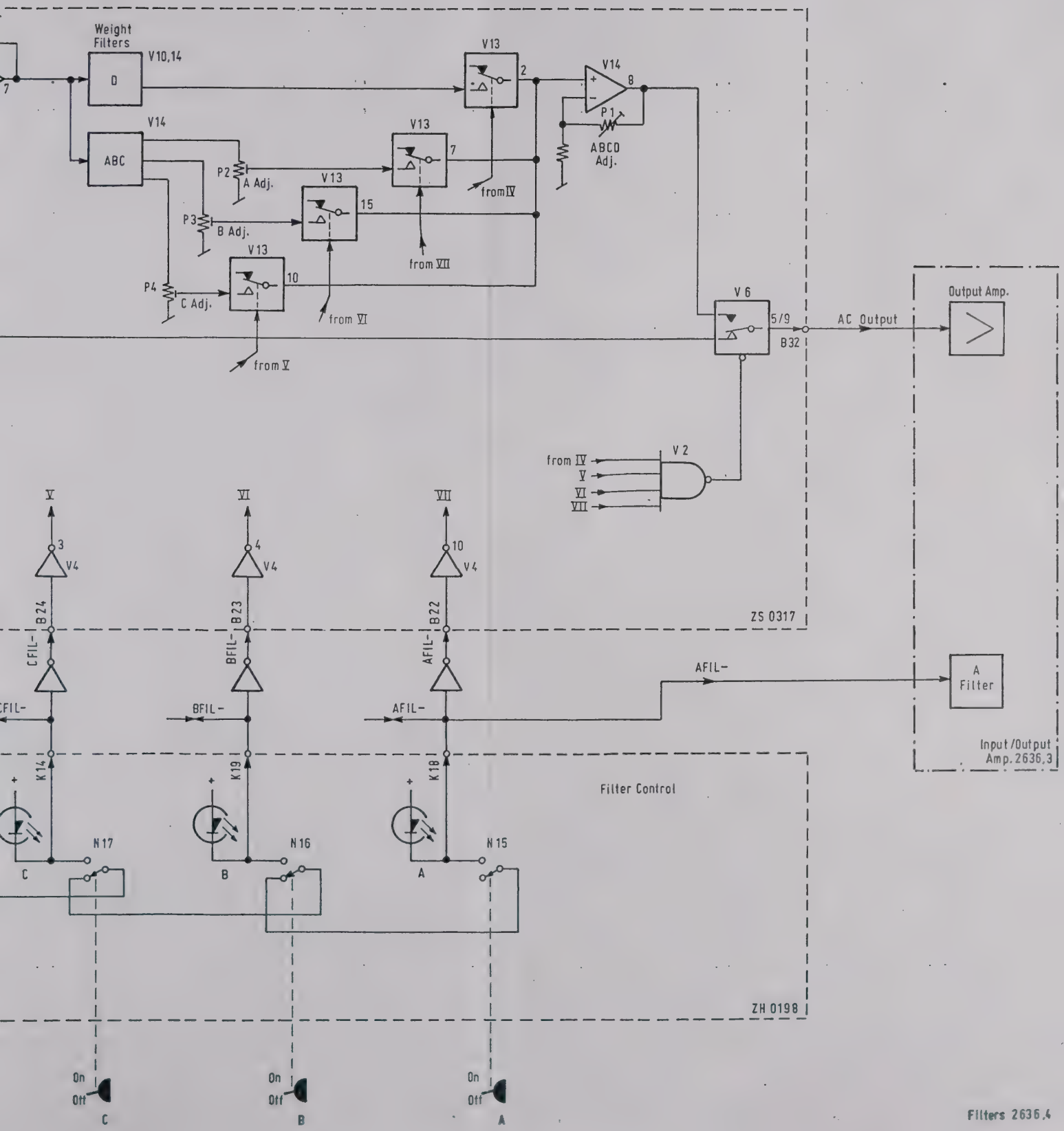
Check the Filter curves according to below scheme:

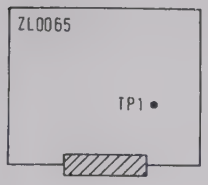
Input Frequency	FILTERS 22,4 Hz	22,4 kHz	D	A	B	C
10 Hz	−43,3 ± 5		−27,3 ± 1,5	−70,6 ± 1	−38,6 · $\frac{1}{2}$	−14,7 · $\frac{1}{2}$
20 Hz	−8,1 ± 2		−20,9 ± 1	50,4 ± 1	−24,2 ± 1	−6,2 ± 1
200 Hz	0		−2,7 ± 0,5	−10,8 ± 0,3	−2,1 ± 0,3	0 ± 0,3
1 kHz	0	0	0	0	0	0
2 kHz	0		+ 7,9 ± 0,5	+ 1,2 ± 0,3	−0,1 ± 0,3	0,2 ± 0,3
10 kHz	0		+ 3,3 ± 0,5	−2,4 ± 1	−4,3 ± 1	−4,4 ± 1
20 kHz	0	−0,4 ± 0,2	−3,1 ± 1	9,4 ± 1	−11,3 ± 1	−11,4 ± 1
200 kHz	0	> 60	−26,6 · $\frac{5}{2}$	−56,8 · $\frac{5}{2}$	−64,8 · $\frac{5}{2}$	−68,0 · $\frac{5}{2}$

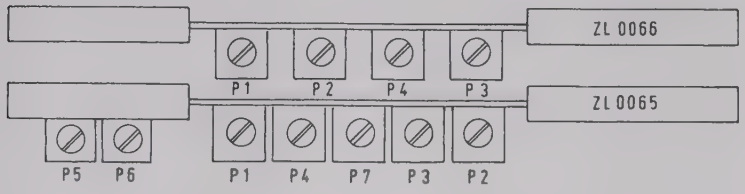
Ref.

dB attenuation


Ext. Filter
From Ext. Filter
From
B14
Input Buffer
V 7
V 11
22,4 Hz
HP Filter
V9
V12
22,4 kHz
LP Filter
V10,14
V12
from I
from II
from III
Input Amp.
Input/Output Amp 2636,3
Input
AC Input
B1
V 11
V 11
V 12
V 12
from I
from I
from I
from II
from III
I
II
III
IV
V3
V3
V3
V4
B20
B11
B10
B21
EXFIL-
HPFIL-
LPFIL-
DFIL-
I/O Expand
EXFIL-
HPFIL-
LPFIL-
DFIL-
CFIL-
BFIL-
AFIL-
K 47
K 27
K 32
K 30
Ext.
HP
LP
D
N 11
N 12
N 13
N 14
V 11
V 11
V 11
V 11
I/O Expand
LOCAL
K29
Processor 2636,7
On
Off
EXT.
On
Off
22,4 Hz
On
Off
22,4 kHz
On
Off
D
FILTERS


Weight Filters
V10,14
D
ABC
V14
P1
ABCD Adj.
P2
A Adj.
P3
B Adj.
P4
C Adj.
V13
2
7
15
10
from IV
from VII
from VI
from V
V6
5/9
B32
AC Output
Output Amp.
V2
from IV
V
VI
VII
ZS 0317
V4
3
4
10
B24
B23
B22
CFIL-
BFIL-
AFIL-
A Filter
Input/Output Amp. 2636.3
Filter Control
K14
K19
K18
N17
N16
N15
C
B
A
ZH 0198
On
Off





5.1 Adjustment Procedure

Rectifier

INPUT SECTION GAIN: "100 mV
OUTPUT SECTION GAIN: "x1"
INPUT SELECT: "Direct", "Off"
INPUT GAIN: "Cal "
FILTERS: "Linear 1 Hz — 200000 Hz
DETECTOR FUNCTION: "Fast"
DETECTOR OUTPUT: "Norm ", "Log 30 dB"
PEAK RISE: "5 μs/dB"
PEAK DECAY: "Fast
Meter Scale "SA 0259

Input signal to "Direct Input" 1000 mV, 1 kHz

Decrease the input voltage by 30 dB
Note the "DC Output" voltage
Decrease the input voltage by 10 dB
Note the "DC Output" voltage
Note the difference between the two voltages = A

Decrease the input voltage by 20 dB
Note the "DC Output" voltage
Decrease the input voltage by 10 dB
Note the "DC Output" voltage
Note the difference between the two voltages = B

Adjust P7 on ZL 0065 to A = B ± 5 mV or less

Connect an oscilloscope to TP1 on ZL 0065 and check that the top of the curves are within ± 2 mV
If necessary adjust P3 and repeat the above adjustment.

Input voltage to 1000 mV

Decrease the input voltage by 10 dB
Note the "DC Output" voltage
Decrease the input voltage by 10 dB
Note the "DC Output" voltage
Note the difference between the two voltages = C

Adjust P1 on ZL 0065 to A = C ± 5 mV or less

Input voltage to 1000 mV

Decrease the input voltage by 10 dB
Check the top of the curves to be within ± 1 mV on the oscilloscope
If necessary adjust P4 on ZL 0065
Repeat the adjustment of P1, P4 as they influence each others

Input voltage to 1000 mV

Check at "DC Output" that the steps from —10 to —70 dB of the input voltage are equal within ± 5 mV

DC Level (Log)

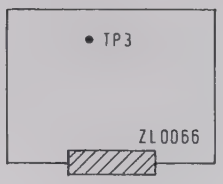
Input signal 1 kHz adjusted to exactly 1000 mV at "1 V AC Output" socket.

Decrease the input voltage by 50 dB
Check the voltage at "DC Output": 0 V ± 2 mV
If necessary adjust P2 (ZL 0065)

DC Gain (Log)

Input voltage 100 mV

Check the "DC Output" voltage: 5,000 mV ± 5 mV
If necessary adjust P3 (ZL 0066)



Meter Amplifier

Input signal to "Direct Input": 1 kHz
adjusted to 2000 mV ± 2 mV on "DC Output"

Check the voltage at TP3 (ZL 0066): 0 V ± 5 mV
If necessary adjust P2

Adjust the Meter to its mechanical zero

Input voltage to 100 mV RMS
Check FSD at the Meter
If necessary adjust P1 (ZL 0066)

Log/Lin Converter

Input voltage to 1000 mV ± 5 mV at "1 V AC Output"

DETECTOR OUTPUT to "Lin"

Check the "DC Output" voltage: 5000 mV ± 5 mV
If necessary adjust P5 (ZL 0065)

Decrease the input voltage by 50 dB
"DC Output" voltage: 15.8 mV ± 0.1 mV
If necessary adjust P6 and repeat the adjustment of P5

Check the Linearity according to below scheme:

Input Voltage	DC Output Voltage	Tolerances
100 mV	5000 mV	± 10 mV
31.6 mV	1581 mV	± 10 mV
10 mV	500 mV	± 6 mV
3.16 mV	158 mV	± 2 mV
1 mV	50 mV	± 0,6 mV
0,31 mV	15.8 mV	± 0.2 mV

Peak Detector

Input voltage to 31,6 mV

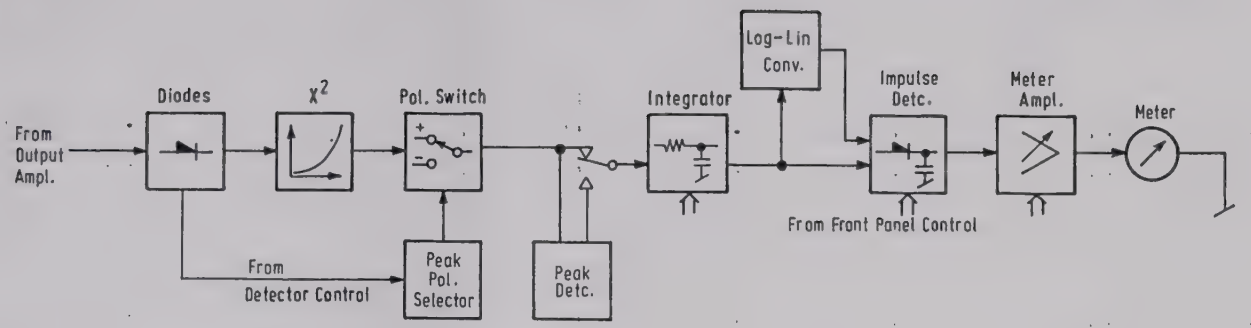
DETECTOR FUNCTION to "Max Peak"
DETECTOR OUTPUT to "Log 30 dB"

Check the "DC Output" voltage: 4301 mV ± 5 mV
If necessary adjust P4 on ZL 0066

DECTECTOR FUNCTION to "RMS Fast"

"DC Output" voltage: 4.000 mV ± 5 mV

SIMPLIFIED DIAGRAM



		A	B
DETECTOR OUTPUT	Lin	high	low
	Log 30 dB	low	low
	Log 60 dB	low	high

		D	F	H	C
DETECTOR OUTPUT	Norm.	high	low	high	high/low
	Max. Hold	low	low	high	low
	Reset	(low) high	high	low	high/low

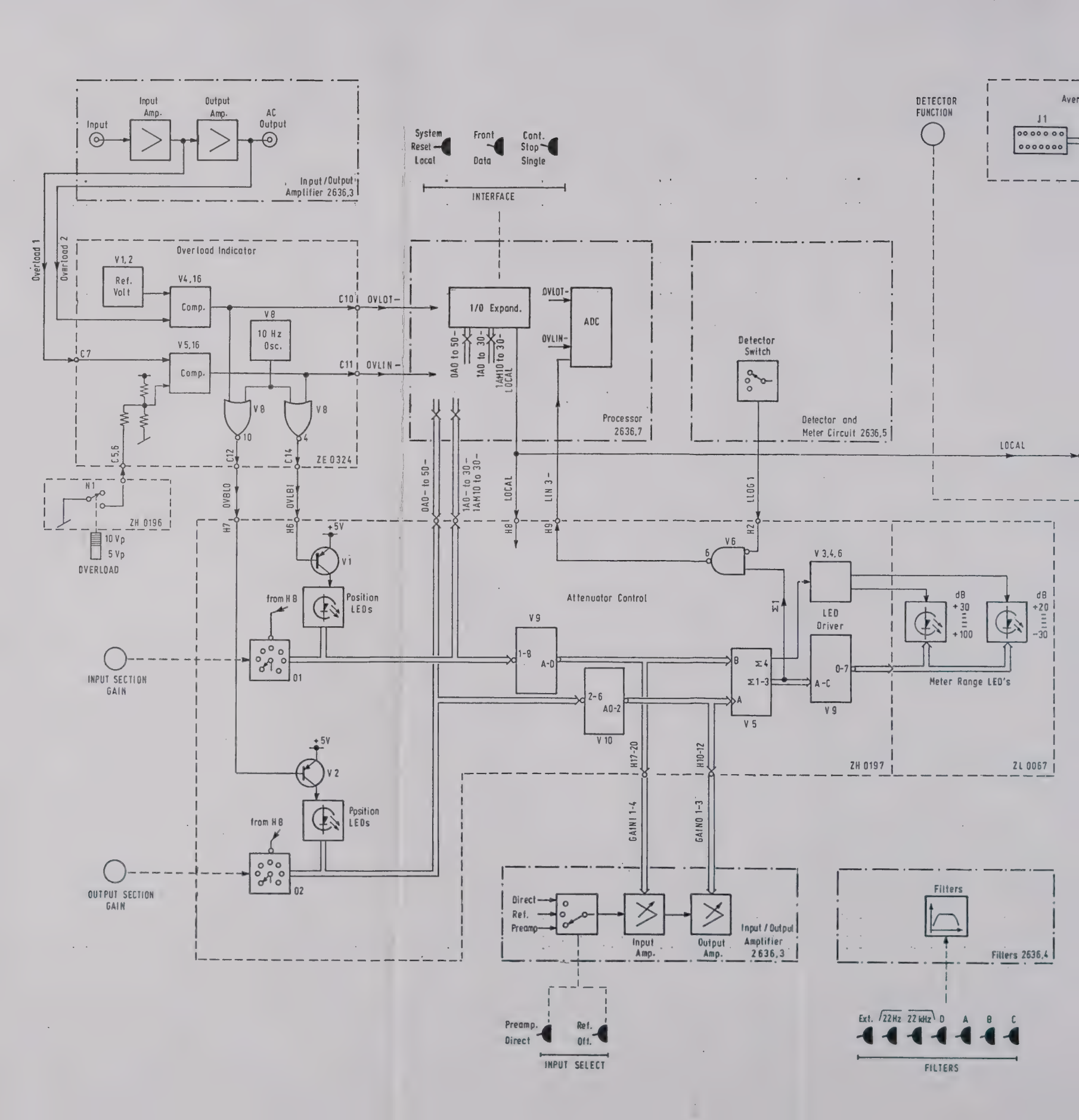
		E	G
PEAK DECAY	Fast	low	low
	Slow	high	low
	Max. Hold 0,5 s	high	high

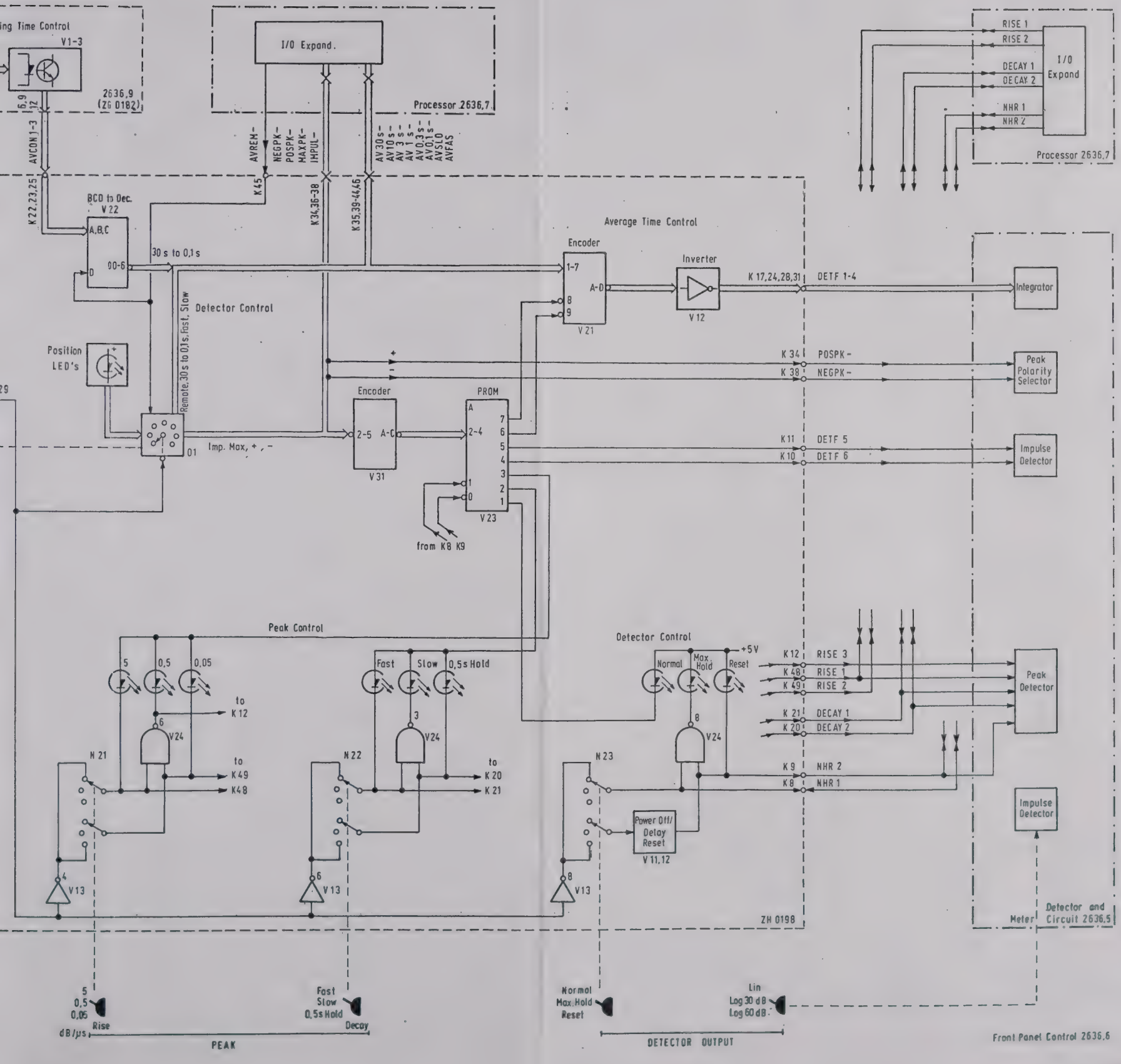
		J	K
PEAK RISE	5	0	1
	0,5	1	0
	0,05	1	1

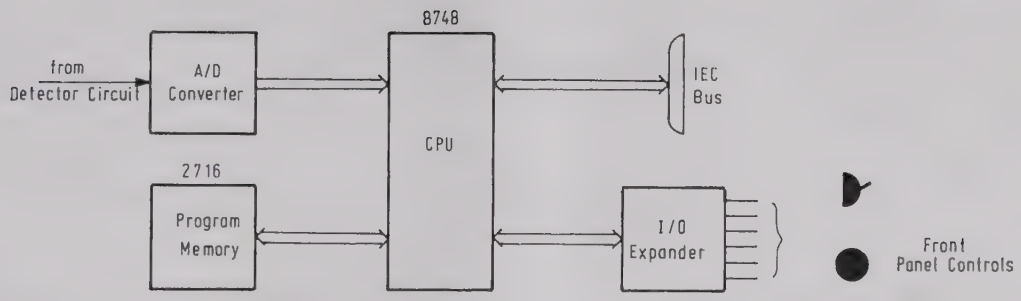
		C
DETECTOR FUNCTION	Impulse	low
	all others	high

high = 15 V
low = —15 V
0 = 0 V
1 = 5 V

The letters above the tables refers to the incircled letters in the simplified diagram

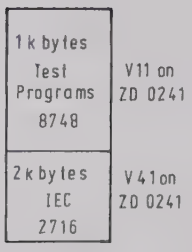

Input
Input Amp.
Output Amp.
AC Output
Input/Output Amplifier 2636,3
System Reset Local
Front Data
Cont. Stop Single
INTERFACE
DETECTOR FUNCTION
J1
Overload 1
Overload 2
Overload Indicator
V1,2
Ref. Volt
V4,16
Comp.
V5,16
Comp.
V8
10 Hz Osc.
C10
OVLOT-
C11
OVLIN-
C7
C5,6
C12
C14
ZE 0324
N1
ZH 0196
10 Vp
5 Vp
OVERLOAD
1/0 Expand.
ADC
OVLOT-
OVLIN-
0A0 to 50-
1A0 to 30-
1AM10 to 30-
LOCAL
Processor 2636,7
Detector Switch
Detector and Meter Circuit 2636,5
LOCAL
OVBLO
OVBLI
0A0- to 50-
1A0- to 30-
1AM10 to 30-
LOCAL
LIN 3-
LLOG 1
H7
H6
H8
H9
H2
+5V
V1
V6
V 3,4,6
LED Driver
Position LEDs
from H8
Attenuator Control
V9
1-8
A-0
2-6
A0-2
V 10
B
A
V 5
Σ4
Σ1-3
0-7
A-C
V 9
W1
dB +30 ... +100
dB +20 ... -30
Meter Range LED's
INPUT SECTION GAIN
01
+5V
V2
Position LEDs
from H8
OUTPUT SECTION GAIN
02
H17-20
H10-12
GAIN1 1-4
GAIN0 1-3
ZH 0197
ZL 0067
Direct
Ref.
Preamp
Input Amp.
Output Amp.
Input/Output Amplifier 2636,3
Filters
Filters 2636,4
Preamp.
Direct
Ref.
Off.
INPUT SELECT
Ext.
22Hz
22 kHz
D
A
B
C
FILTERS

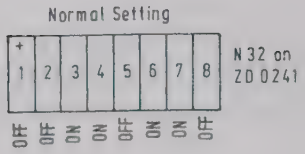

ing Time Control
V1-3
2636,9
(ZG 0182)
6,9
12
AVCON1-3
I/O Expand.
Processor 2636,7
AVREM-
NEGPK-
POSPK-
MAXPK-
IMPUL-
AV30s-
AV10s-
AV 3s-
AV 1s-
AV0,3s-
AV0,1s-
AVSLO
AVFAS
K45
K34,36-38
K35,39-44,46
K22,23,25
BCD to Dec.
V22
A,B,C
D
00-6
30 s to 0,1 s
Remote,30s to 0,1s,fast, Slow
Detector Control
Position
LED's
01
Imp. Max, +, -
Encoder
2-5 A-C
V31
PROM
A
2-4
7
6
5
4
3
2
1
0
V23
from K8 K9
Average Time Control
Encoder
1-7
A-D
8
9
V21
Inverter
V12
K 17,24,28,31
DETF 1-4
Integrator
K 34
POSPK-
K 38
NEGPK-
Peak
Polarity
Selector
K 11
DETF 5
K 10
DETF 6
Impulse
Detector
RISE 1
RISE 2
DECAY 1
DECAY 2
NHR 1
NHR 2
I/O
Expand
Processor 2636,7
Peak Control
5
0,5
0,05
to
K 12
6
V24
N 21
to
K49
K48
4
V13
Fast
Slow
0,5s Hold
3
V24
N 22
to
K 20
K 21
6
V13
Detector Control
Normal
Max.
Hold
Reset
+5V
8
V24
N 23
Power Off/
Delay
Reset
V 11,12
8
V13
K 12
RISE 3
K 48
RISE 1
K 49
RISE 2
K 21
DECAY 1
K 20
DECAY 2
K 9
NHR 2
K 8
NHR 1
Peak
Detector
Impulse
Detector
ZH 0198
Detector and
Meter
Circuit 2636,5
5
0,5
0,05
dB/µs
Rise
Fast
Slow
0,5s Hold
Decay
PEAK
Normal
Max.Hold
Reset
Lin
Log 30 dB
Log 60 dB
DETECTOR OUTPUT
Front Panel Control 2636,6



General

The digital section in 2636 is based on the Intel μProcessor 8748 and a PROM 2716 for program storage The 8748 CPU acts as a main controller for the digital functions in 2636 These functions might be split-up in the following way





1 Test programs
2 Talk Listen-Remote Control-IEC functions

For further information about the IEC-function implemented; the Instruction Manual sec 5 should be consulted

CPU (ZD 0241)

All Mnemonics for signals on PC-Board connectors are explained in Mnemonics Listing See page 7-5 The following descriptions are referred to the Simplified Diagram

The 8748 is a single chip 8 bits computer with an 1K bytes internal PROM program memory Further more the 8748 has a 64 bytes data RAM The external X-Tal is 4.8 MHz

The 2716 is an EPROM with 2K bytes memory The program for 2636 is stored as follows:

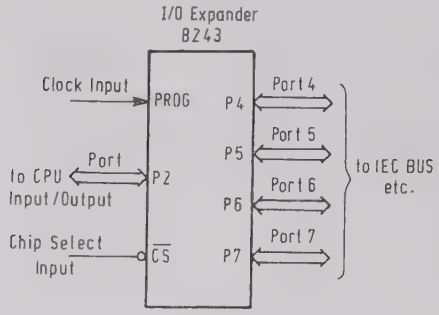
The 8748 contains the testprogram for selftest of 2636 and Signature Analysis In 2716 the program for all IEC-Interface functions is stored Since the digital control functions for 2636 are contained in only 2 PC boards namely ZD 0241 and ZD 0240 these two PC boards may be removed and all the analog functions will still work Of cource, testprograms and IEC functions cannot be executed When trouble shooting the 2636 the 8748 (V11 on ZD 0241) might be removed and replaced by any other 8748 or 8035 When it is done it is important to set switch N32 7 in Off position

The Data/Address Bus in the 8748 is multiplexed and it is used for both Data In and Data Out to the CPU The signal direction is dependent of the control signals RD Read is used as a Read Strobe to the Decode V22 PSEN Program Store Enable is active during a fetch to the PROM V41 ALE Address Latch Enable is active once during each clock cycle and is used as an clock signal for the Address Latch V21
These signals make it possible to transfer signals to and from the CPU

Certain control signals is led through a switch N32 on ZD 0241 This switch is used to signature analysis and should not be touched unless noted The switch is not shown on the simplified diagram

The address in the PROM V41 is selected with the LSB part through the Address Latch V21 and the MSB part from P2 (Port 2) on the CPU The selected address in the PROM contains a new instruction which is transferred to the CPU via the Data/Address Bus

The Bus is also used to transfer data from the A/D Converter on ZD 0240 Furthermore data from the Address Switch on ZD 0242 and Filter Switch on ZG 0182 are transferred via the bus



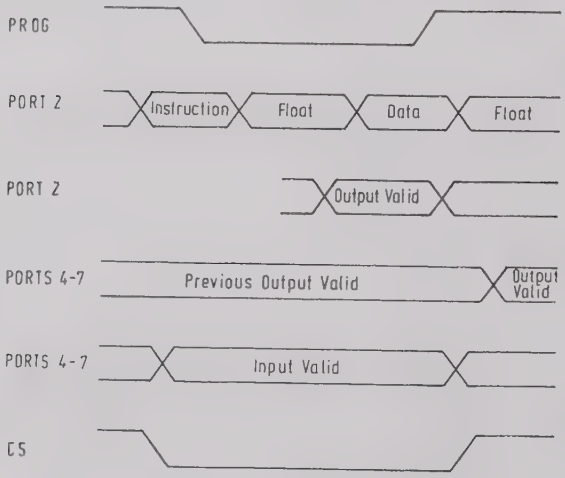
P1 (Port 1) on the CPU is dedicated Data I/O to the IEC-Bus The signal direction is controlled by TALK

Handshake and Control signals to the IEC BUS is led through I/O Expander V42

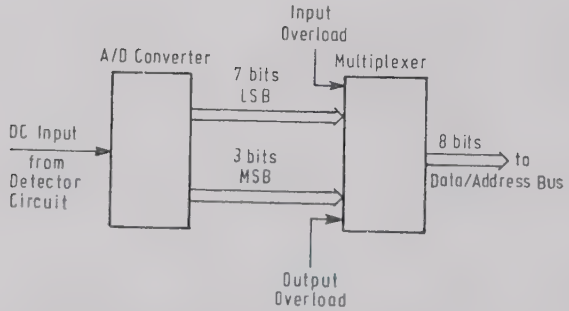
The I/O Expander 8243 contains 4 pcs 4 bits bidirectional I/O parts and a 4 bits interface port which is connected to the 8748 CPU (V11) The I/O Expander is selected by CS Chip Select Programming is performed by PROG and P2

P21	P20	Address Code	P23	P22	Instruction Code
0	0	Port 4	0	0	Read
0	1	Port 5	0	1	Write
1	0	Port 5	1	0	ORLD
1	1	Port 7	1	1	ANLD

P20-P21 selects the Address Code (See table) P22-P23 selects Read or Write (see table) PROG high to low indicates that Address Code and Control are valid
PROG low to high indicates that data are valid

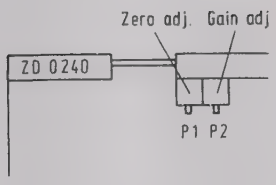


To P2 (Port 2) there are connected further 3 pcs of I/O Expanders (V11, V12 and V21 on ZD 0240) These I/O Expanders are connected to most front panel controls so that the 2636 may be controlled remotely When the 2636 is under Remote Control the signal LOCALis low It should be noted that the I/O Expanders never can be selected simultaneously Only one at a time can be selected Nevertheless the data on the I/O Expander outputs are valid since the outputs are latched



A/D Converter (ZD 0240)

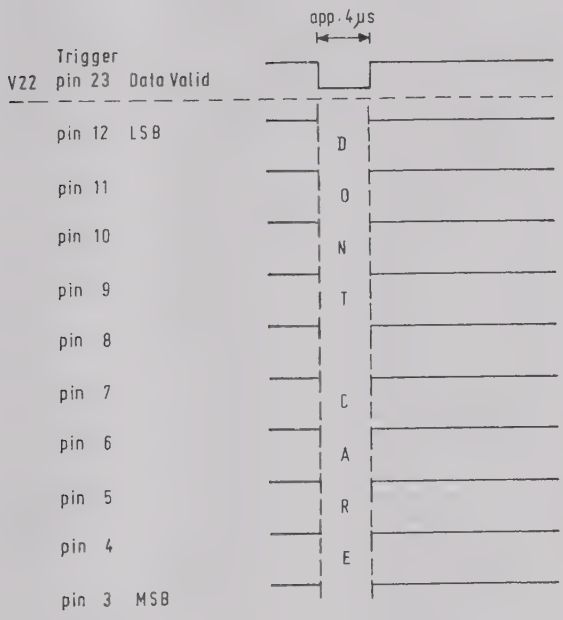
The Analog/Digital Converter is a 10 bits CMOS monolitic device The conversion is performed by an incremental charge balancing method providing high accuracy, linearity and noise immunity Because of the charge balancing technique the voltage on the input pin is near zero Therefore if you want to monitor the input it is necessary to connect the oscilloscope between R1 and R2 The duration of the conversion is 6 ms, and starts on the positive edge of ADSTC ADSTC is send every 10 ms The digitized signal consists of 10 bits and all bits should be transferred to the 8 bits Data Bus Therefore the signals from the ADC and 2 overload signals from the OVERLOAD INDICATOR are multiplexed in 2 pcs 3-State Non Inverting Buffers (V31-V32 on ZD 0240) to form a 8 bits signal to the Data/Address Bus The Multiplexers are selected by ADLOW- and ADHIG—



POWER: "On"
INPUT SECTION GAIN: "30 V"
INPUT GAIN: "Cal "
OUTPUT SECTION GAIN: "1"
INPUT SELECT: "Direct" "Off"
DETECTOR FUNCTION: "0,1 s"
FILTERS: "Linear 1 — 200 000 Hz"
DETECTOR OUTPUT: "Norm ", "Lin"
INTERFACE: "Data", Read Out, Cont
ADR SWITCH (rear side): 00100110 (8—1)

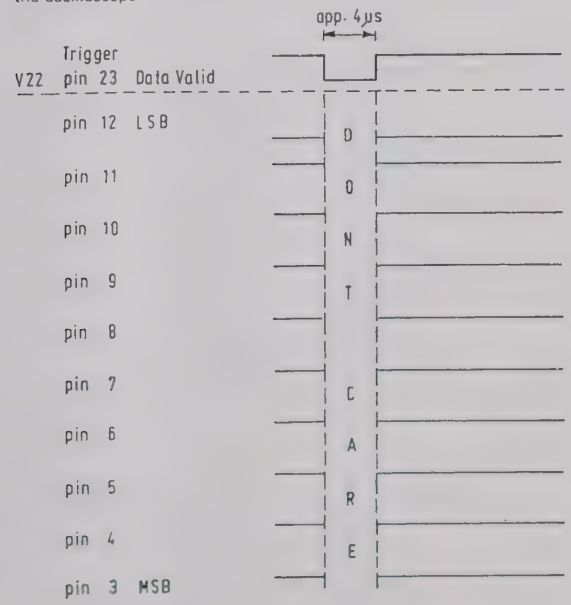
When the Front Panel setting is done, POWER should be switched "off/on"

Input signal to Direct Input Approx 50 mV, 1 kHz



Adjust the input voltage to 3,91 mV on "DC Output" (slightly unstable)

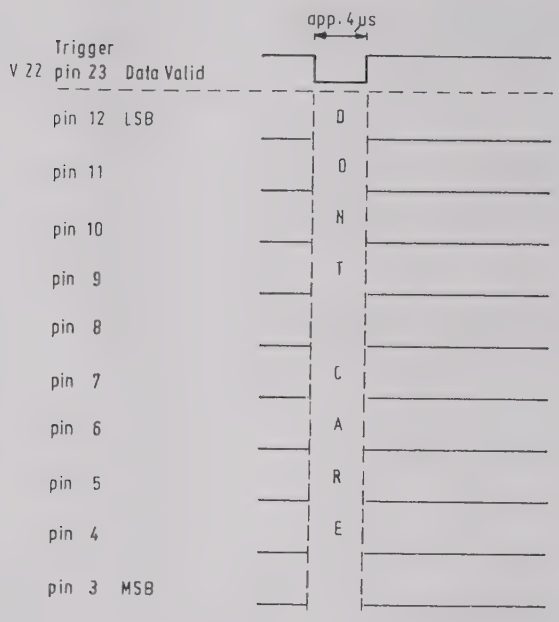
Turn P1 (ZERO ADJ) CCW so that all bits are low. All digital signals should be monitored directly on the ADC Chip V22 The negative edge on Data Valid V22 pin 23 is as a trigger for the oscilloscope



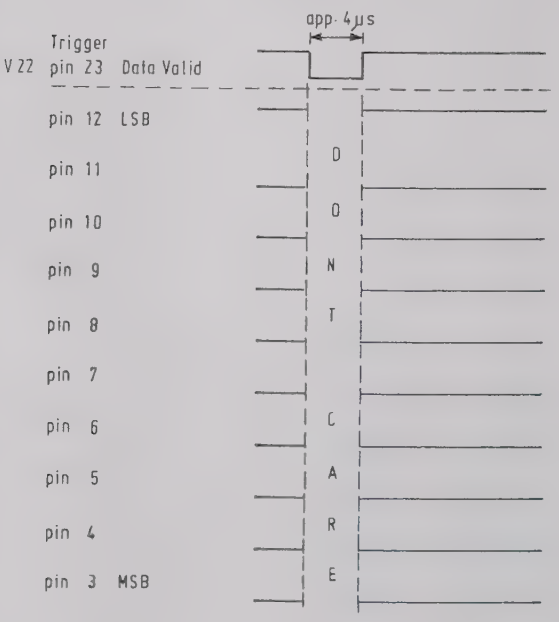
Turn P1 slowly CW until LSB (pin 12) just alternate Make sure that all other bits still are low

INPUT SECTION GAIN to "30 mV"
FILTERS to "Linear 1 — 200000 Hz"
DETECTOR OUTPUT to "Norm ", "Lin"

Fineadjust the input voltage to 7578 mV on "DC Output"



Turn P2 (Gain Adj) slowly CCW so that all bits turns high



Turn P2 slowly CW until LSB (pin 12) just alternate Make sure that all other bits still are high

Mnemonics for ZD 0241 (G-Connector)

Pin	Mnemonic	Signal Name
1a	SELFI—	Select Filter Switch
b	SELAD—	Select Adr Switch
2a	SELSW—	Select Rear Panel Switch
b	ATNI—	Attention (input IEC)
3a	SRQO—	Service Request (output IEC)
b	IFCI—	Interface Clear (input IEC)
4a	NDACI—	Not Data Accepted (input IEC)
b	NDACO—	Not Data Accepted (output IEC)
5a	NRFDI—	Not Ready For Data (input IEC)
b	INTH—	Interrupt of Handshake (IEC)
6a	NRFDO—	Not Ready For Data (output IEC)
b	DAVI—	Data Valid (input IEC)
7a	LISTN	Listen or Bus Idle (IEC)
b	DAVO —	Data Valid (output IEC)
8a	EOIO—	End or Identify (output IEC)
b	RENI—	Remote Enable (input IEC)
9a	TALK	Talker (IEC)
b	DIO8—	Data I/O bit 8 (IEC)
10a	DIO7—	Data I/O bit 7 (IEC)
b	DIO6—	Data I/O bit 6 (IEC)
11a	DIO5—	Data I/O bit 5 (IEC)
b	DIO4—	Data I/O bit 4 (IEC)
12a	DIO3—	Data I/O bit 3 (IEC)
b	DIO2—	Data I/O bit 2 (IEC)
13a	DIO1 —	Data I/O bit 1 (IEC)
b	STAFI—	Start Filter (1617)
14a	PENR—	Pen Down recorder (1617)
b	TLED—	Talk Diode
15a	STIR—	Stop Recorder (1617)
b	LLED—	Listen Diode
16a	LOCAL	Local — Front Panel
b	RTNL—	Return to local switch (IEC)
17a	ALE	Address Latch Enable
b	RESET—	System Reset Switch
18a	RD—	Read
b	START—	Start Talk Switch
19a	INT —	Interrupt
b	STOP	Stop Talk Switch
20a	PSEN-	Program Store Enable
b	ADSTC —	A/D Converter Start Conversion
21a	DGND	Digital Gnd
b	DGND	Digital Gnd
22a	ADHIG—	A/D Converter High
b	VCCIO—	Vcc to I/O Ports
23a	+ 5V	+ 5V
b	+ 5V	+ 5V
24a	RAVR -	Filter Shift recorder (1617)
b	ADLOW	A/D Converter Low
25a	DBUS0	Data Bus bit 0
b	DBUS1	Data Bus bit 1
26a	DBUS2	Data Bus bit 2
b	DBUS3	Data Bus bit 3
27a	DBUS4	Data Bus bit 4
b	DBUS5	Data Bus bit 5
28a	DBUS6	Data Bus bit 6
b	DBUS7	Data Bus bit 7
29a	PROG	Program and Strobe for I/O Ports
b	SLIO1—	Select I/O Port 1
30a	PRT20	Port 2 bit 0
b	SLIO2 -	Select I/O Port 2
31a	PRT22	Port 2 bit 2
b	SLIO3	Select I/O Port 3
32a	PRT21	Port 2 bit 1
b	PRT23	Port 2 bit 3

Mnemonics for ZD 0240 (D-Connector)

Pin	Mnemonic	Signal Name
1a	DBUS0	Data Bus bit 0
b	DBUS2	Data Bus bit 2
2a	DBUS1	Data Bus bit 1
b	DC-Input	A/D Converter DC Input
3a	AGND	Analog Gnd
b	ADLOW—	A/D Converter Low
4a	DBUS3	Data Bus bit 3
b	ADHIG—	A/D Converter High
5a	DBUS4	Data Bus bit 4
b	NHR2	Normal, Hold, Reset Switch
6a	DBUS5	Data Bus bit 5
b	NHR1	Normal, Hold, Reset Switch
7a	DBUS6	Data Bus bit 6
b	LLOG2	Linear, Log Switch
8a	DBUS7	Data Bus bit 7
b	LLOG1	Linear log switch
9a	SLIO1—	Select I/O Port 1
b	OVLIN—	Overload Input Section
10a	SLIO2—	Select I/O Port 2
b	OVLOT—	Overload Output Section
11a	SLIO3—	Select I/O Port 3
b	CFIL—	C Filter
12a	PRT23	Port 2 bit 3
b	AVFAS—	Averaging Time Fast
13a	PRT22	Port 2 bit 2
b	EXFIL—	External Filter
14a	PRT21	Port 2 bit 1
b	HPFIL—	High Pass Filter (22.4 Hz)
15a	PRT20	Port 2 bit 0
b	LPFIL—	Low Pass Filter (22.4 kHz)
16a	PROG	Program and Strobe for I/O Ports
b	DFIL—	D Filter
17a	RISE2	Rise Switch
b	AV1S—	Averaging Time 1S
18a	RISE1	Rise Switch
b	AV3S—	Averaging Time 3 S
19a	DECAY2	Decay Switch
b	AV10S—	Averaging Time 10 S
20a	DECAY1	Decay Switch
b	AVREM—	Averaging Time Remote
21a	BUSY	A/D Converter
b	AV30S—	Averaging Time 30 S
22a	REF—	Reference
b	AVSLO—	Averaging Time Slow
23a	PRE—	Preamplifier
b	AVO1S—	Averaging Time 0.1 S
24a	DIR—	Direct
b	AVO3S—	Averaging Time 0 3 S
25a	MAXPK—	Maximum Peak
b	AFIL—	A Filter
26a	IMPUL—	Impulse
b	BFIL—	B Filter
27a	POSPK—	Positive Peak
b	LIN3—	Linear 3 x
28a	NEGPK—	Negative Peak
b	VCCIO—	Vcc to I/O Ports
29a	+ 18 V	+ 18 V
b	—18 V	—18 V
30a	ADSTC	A/D Converter Start Conversion
b	FRONT	Front (Data/Front Switch)
31a	+ 5 V	+ 5 V
b	+ 5 V	+ 5 V
32a	DGND	Digital Gnd
b	DGND	Digital Gnd

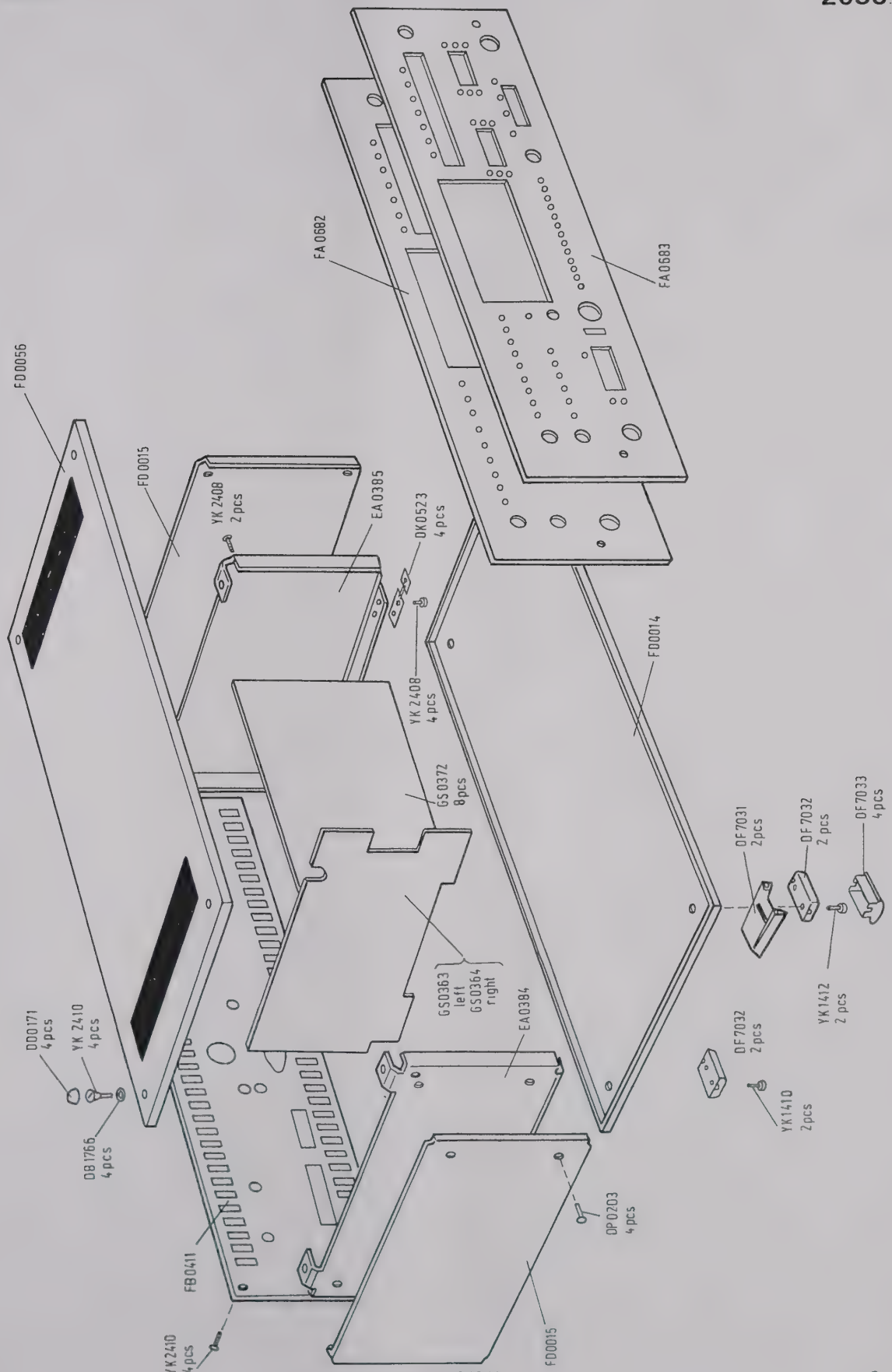
MNEMONICS LISTING

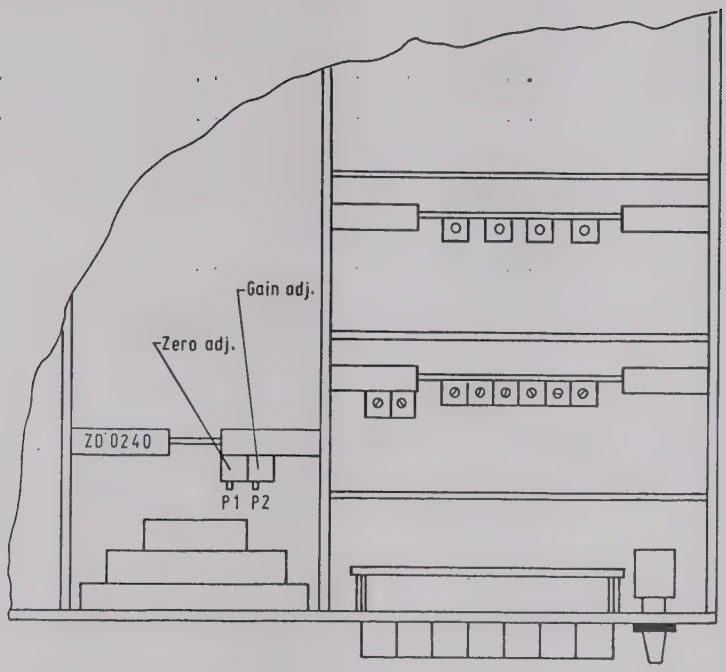
Mnemonics for ZD 0240 (P-Connector)

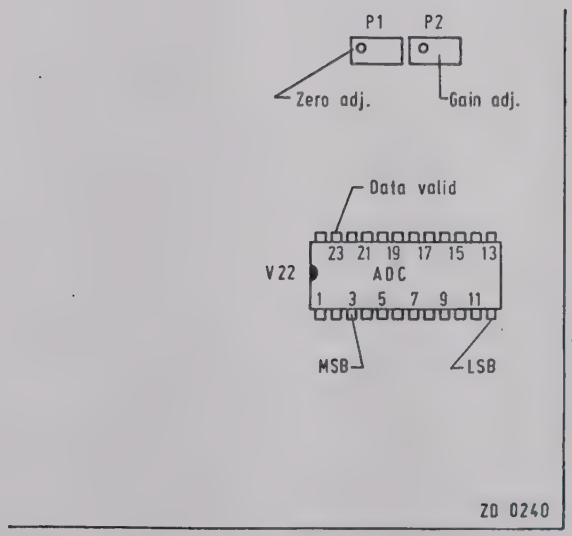
Pin	Mnemonic	Signal Name	
1	IA50—	Input Attenuator	50 dB
2	IAM30—	Input Attenuator	—30 dB
3			
4	IAM20—	Input Attenuator	—20 dB
5	OAO—	Output Attenuator	0 dB
6	IAM10—	Input Attenuator	—10 dB
7	OA10—	Output Attenuator	10 dB
8	IAO—	Input Attenuator	0 dB
9	OA20—	Output Attenuator	20 dB
10	IA10—	Input Attenuator	10 dB
11	OA30	Output Attenuator	30 dB
12	IA20—	Input Attenuator	20 dB
13	OA40	Output Attenuator	40 dB
14	IA30—	Input Attenuator	30 dB
15	OA50	Output Attenuator	50 dB
16	IA40—	Input Attenuator	40 dB

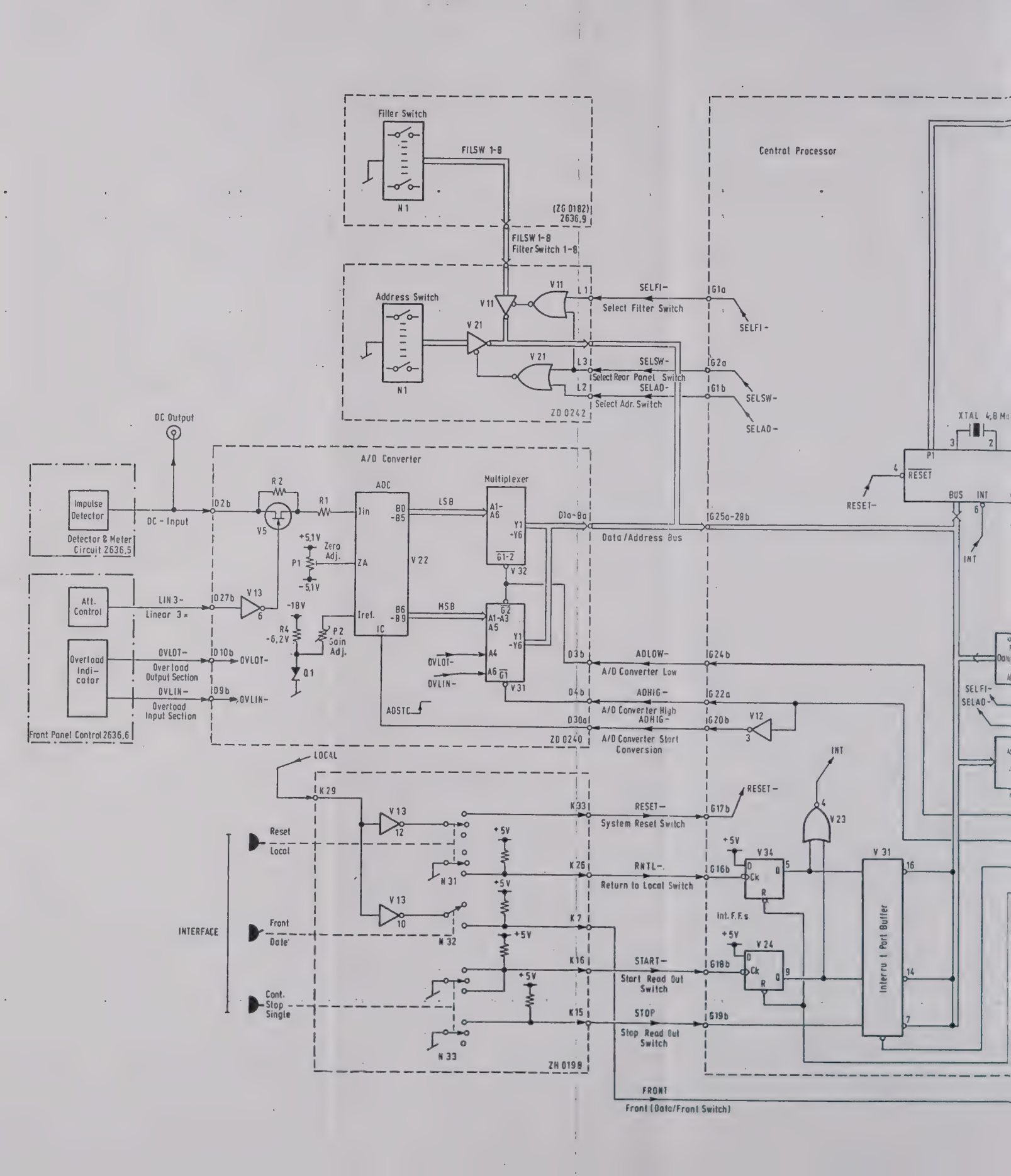
Mnemonics for ZD 0242 (L-Connector)

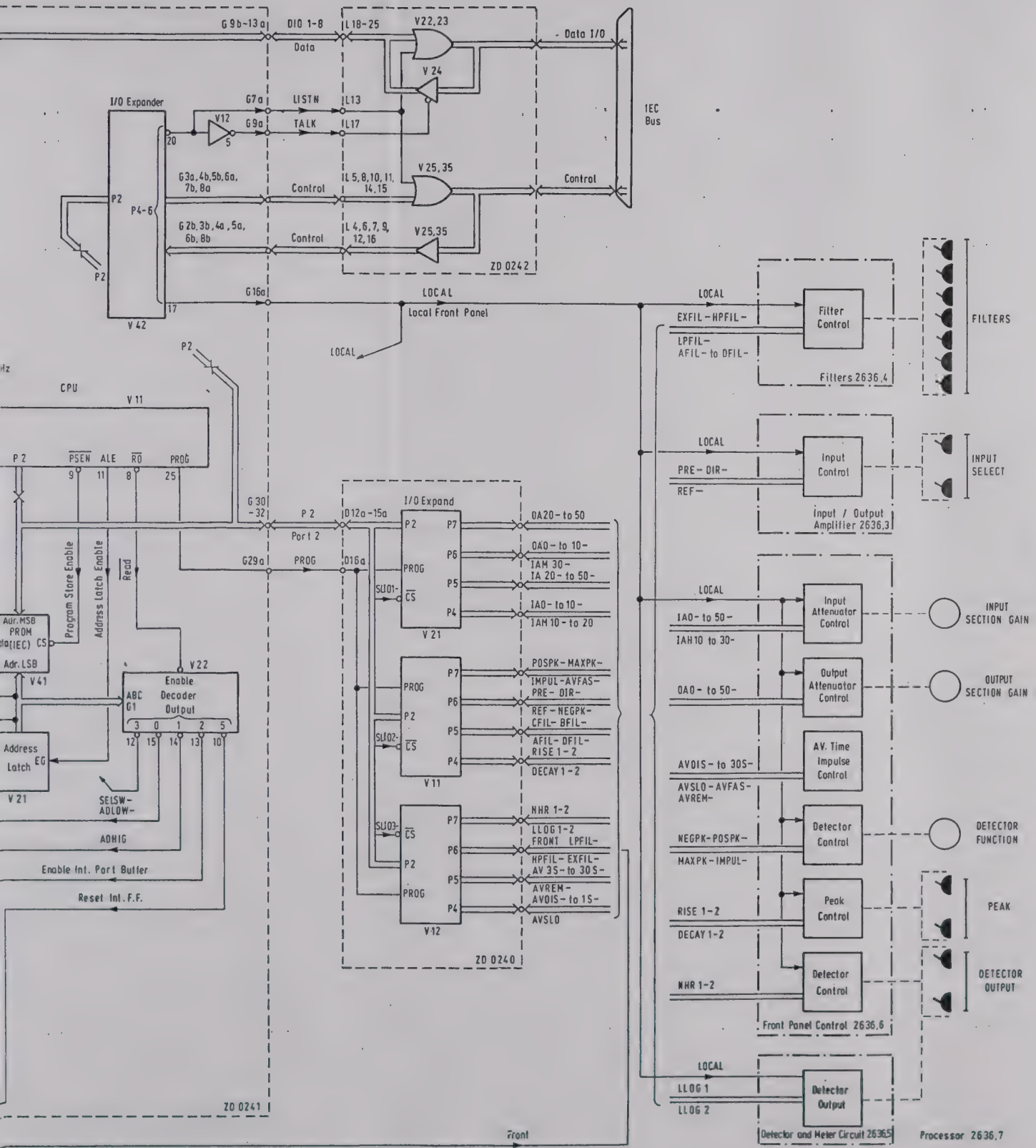
Pin	Mnemonic	Signal Name
1	SELFI—	Select Filter Switch
2	SELAD—	Select Adr Switch
3	SELSW—	Select Rear Panel Switch
4	ATNI—	Attention (input IEC)
5	SRQO—	Service Request (output IEC)
6	IFCI—	Interface Clear (input IEC)
7	NDACI—	Not Data Accepted (input IEC)
8	NDACO—	Not Data Accepted (output IEC)
9	NRFDI—	Not ready For Data (input IEC)
10	INTH—	Interrupt of Handshake (IEC)
11	NRFDO—	Not Ready For Data (output IEC)
12	DAVI—	Data Valid (input IEC)
13	LISTN	Listen or Bus Idle (IEC)
14	DAVO—	Data Valid (output IEC)
15	EOI—	End of Identify (output IEC)
16	RENI—	Remote Enable (input IEC)
17	TALK	Talker (IEC)
18	DIO8	Data I/O bit 8 (IEC)
19	DIO7	Data I/O bit 7 (IEC)
20	DIO6	Data I/O bit 6 (IEC)
21	DIO5	Data I/O bit 5 (IEC)
22	DIO4	Data I/O bit 4 (IEC)
23	DIO3	Data I/O bit 3 (IEC)
24	DIO2	Data I/O bit 2 (IEC)
25	DIO1	Data I/O bit 1 (IEC)
26		
27	DGND	Digital Gnd
28	DGND	Digital Gnd
29		
30		
31	+ 5 V	+ 5 V
32	+ 5 V	+ 5 V
33		
34		
35	FILSW7	Filter Switch no 7
36	DBUS0	Data Bus bit 0
37	FILSW1	Filter Switch no 1
38	DBUS1	Data Bus bit 1
39	FILSW3	Filter Switch no 3
40	DBUS2	Data Bus bit 2
41	FILSW4	Filter Switch no 4
42	DBUS3	Data Bus bit 3
43	FILSW5	Filter Switch no 5
44	DBUS4	Data Bus bit 4
45	FILSW6	Filter Switch no 6
46	DBUS5	Data Bus bit 5
47	FILSW2	Filter Switch no 2
48	DBUS6	Data Bus bit 6
49	FILSW8	Filter Switch no 8
50	DBUS7	Data Bus bit 7

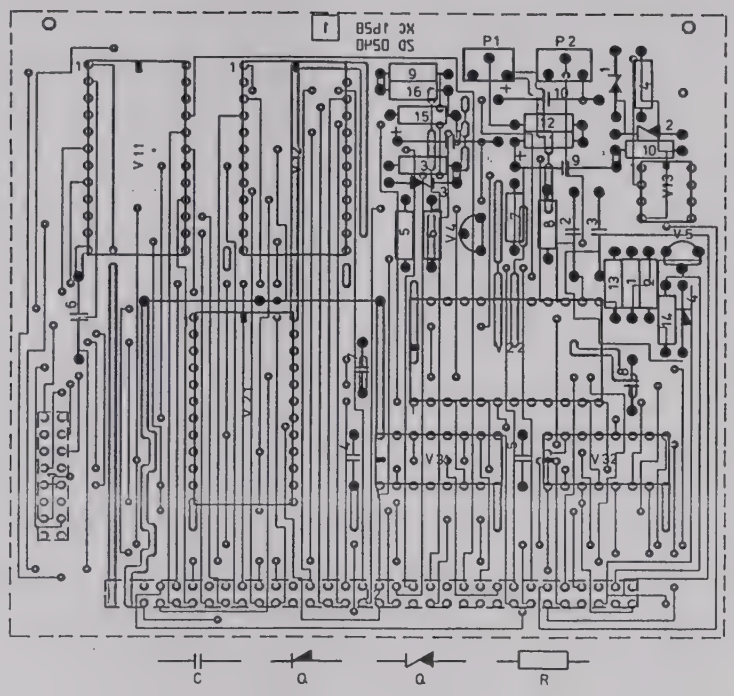

FA 0682
FA 0683
FD 0056
FD 0015
YK 2408
2 pcs
EA 0385
DK 0523
4 pcs
YK 2408
4 pcs
FD 0014
GS 0372
8 pcs
GS 0363
left
GS 0364
right
EA 0384
DF 7031
2 pcs
DF 7032
2 pcs
DF 7033
4 pcs
YK 1412
2 pcs
DF 7032
2 pcs
YK 1410
2 pcs
DD 0171
4 pcs
YK 2410
4 pcs
DB 1766
4 pcs
FB 0411
YK 2410
4 pcs
DP 0203
4 pcs
FD 0015


Gain adj.
Zero adj.
ZD 0240
P1 P2


P1
P2
Zero adj.
Gain adj.
Data valid
23 21 19 17 15 13
V22
ADC
1 3 5 7 9 11
MSB
LSB
ZD 0240


Filter Switch
FILSW 1-8
N1
(ZG 0182) 2636,9
FILSW 1-8
Filter Switch 1-8
Address Switch
N1
ZD 0242
V11
V21
L1
L3
L2
SELFI-
Select Filter Switch
SELSW-
Select Rear Panel Switch
SELAD-
Select Adr. Switch
G1a
G2a
G1b
SELFI-
SELSW-
SELAD-
Central Processor
XTAL 4,8 MHz
P1
RESET
RESET-
BUS
INT
DC Output
DC - Input
Impulse Detector
Detector & Meter Circuit 2636,5
A/D Converter
R2
R1
V5
D2b
ADC
Jin
Iref.
IC
ZA
V22
B0 - B5
B6 - B9
LSB
MSB
Multiplexer
A1-A6
Y1 -Y6
G1-2
V32
+5,1V
Zero Adj.
P1
-5,1V
-18V
R4 -6,2V
P2 Gain Adj.
Q1
Att. Control
LIN 3-
Linear 3 x
D27b
V13
Overload Indi-cator
OVLOT-
Overload Output Section
OVLIN-
Overload Input Section
D10b
D9b
OVLOT-
OVLIN-
Front Panel Control 2636,6
A1-A3
A5
A4
A6
G2
G1
V31
ADSTC
D1a-8a
Data/Address Bus
G25a-28b
D3b
ADLOW-
A/D Converter Low
G24b
D4b
ADHIG-
A/D Converter High
G22a
D30a
A/D Converter Start Conversion
G20b
V12
ZD 0240
SELFI-
SELAD-
LOCAL
K29
INTERFACE
Reset
Local
Front
Date
Cont.
Stop
Single
V13
12
10
N31
N32
N33
+5V
K33
RESET-
System Reset Switch
G17b
K26
RNTL-
Return to Local Switch
G16b
K7
K16
START-
Start Read Out Switch
G18b
K15
STOP
Stop Read Out Switch
G19b
ZH 0198
V34
V24
V23
V31
Int. F.F.s
Interru t Port Buffer
FRONT
Front (Data/Front Switch)

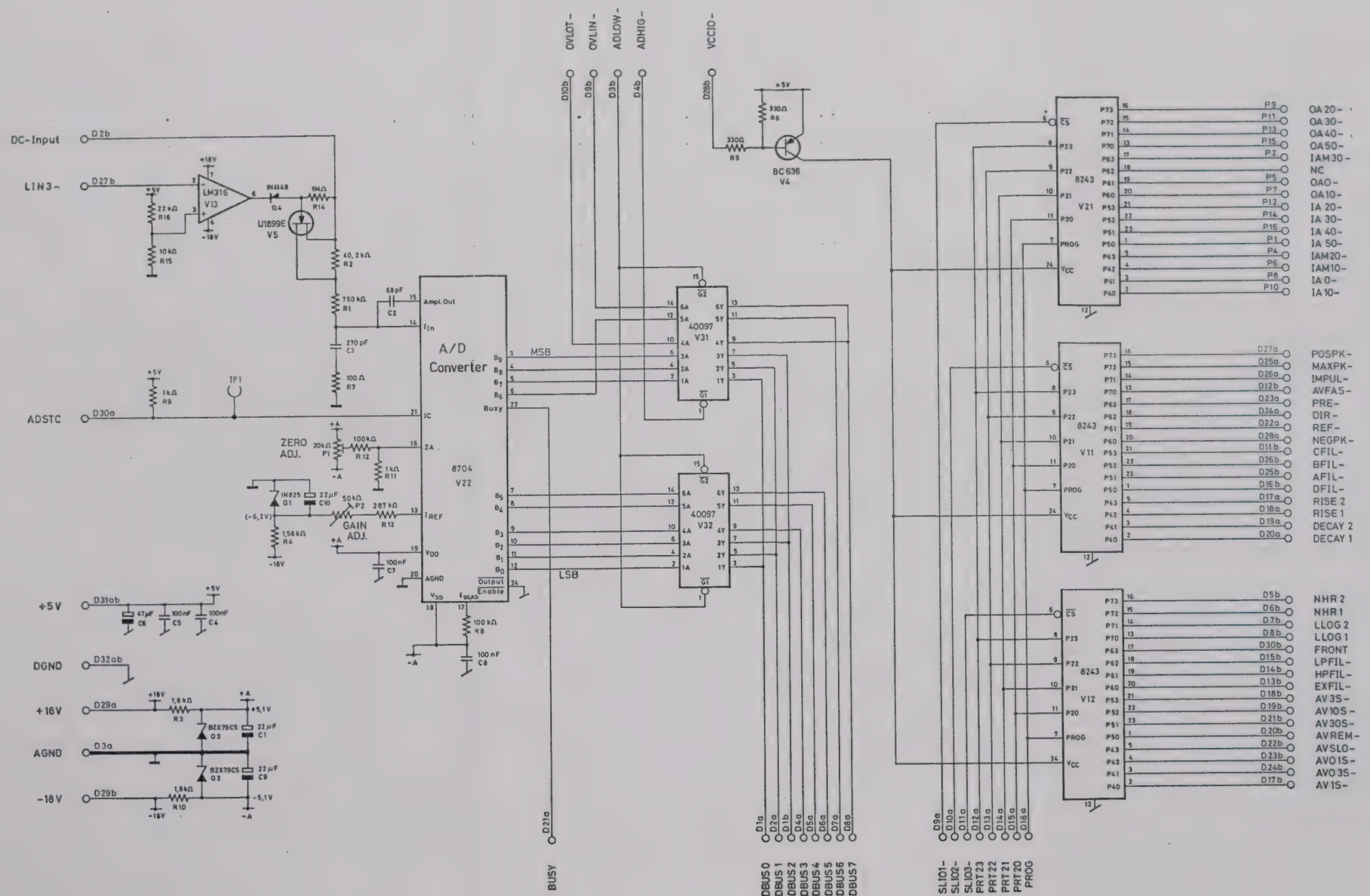

G 9b-13a
DIO 1-8
Data
L18-25
V22,23
Data I/O
V 24
I/O Expander
G7a
LISTN
L13
V12
G9a
TALK
L17
20
5
IEC Bus
G3a,4b,5b,6a, 7b, 8a
Control
L 5, 8, 10, 11, 14, 15
V 25, 35
Control
P2
P4-6
G 2b, 3b, 4a, 5a, 6b, 8b
Control
L 4, 6, 7, 9, 12, 16
V25,35
ZD 0242
P2
G16a
LOCAL
Local Front Panel
17
V 42
LOCAL
CPU
V 11
P 2
PSEN
ALE
RD
PROG
9
11
8
25
G 30 -32
P 2
Port 2
D12a-15a
I/O Expand
G29a
PROG
D16a
Program Store Enable
Address Latch Enable
Read
Adr. MSB PROM
Adr. LSB
V41
V 22
Enable Decoder Output
ABC
G1
3 0 1 2 5
12 15 14 13 10
Address Latch
EG
V 21
SELSW-
ADLOW-
ADHIG
Enable Int. Port Buffer
Reset Int. F.F.
SU01-
SU02-
SU03-
CS
P2
PROG
P7
P6
P5
P4
V 21
V 11
V 12
OA20- to 50
OA0- to 10-
IAM 30-
IA 20- to 50-
IA0- to 10-
IAM 10- to 20
POSPK-MAXPK-
IMPUL-AVFAS-
PRE-DIR-
REF-NEGPK-
CFIL-BFIL-
AFIL-DFIL-
RISE 1-2
DECAY 1-2
NHR 1-2
LLOG 1-2
FRONT LPFIL-
HPFIL-EXFIL-
AV 3S- to 30S-
AVREM-
AVOIS- to 1S-
AVSLO
ZD 0240
ZD 0241
Front
LOCAL
EXFIL-HPFIL-
LPFIL-
AFIL- to DFIL-
Filter Control
Filters 2636,4
FILTERS
LOCAL
PRE-DIR-
REF-
Input Control
Input / Output Amplifier 2636,3
INPUT SELECT
LOCAL
IA0- to 50-
IAH10 to 30-
Input Attenuator Control
INPUT SECTION GAIN
OA0- to 50-
Output Attenuator Control
OUTPUT SECTION GAIN
AVOIS- to 30S-
AVSLO-AVFAS-
AVREM-
AV. Time Impulse Control
NEGPK-POSPK-
MAXPK-IMPUL-
Detector Control
DETECTOR FUNCTION
RISE 1-2
DECAY 1-2
Peak Control
PEAK
NHR 1-2
Detector Control
DETECTOR OUTPUT
Front Panel Control 2636,6
LOCAL
LLOG 1
LLOG 2
Detector Output
Detector and Meter Circuit 2636,5
Processor 2636,7

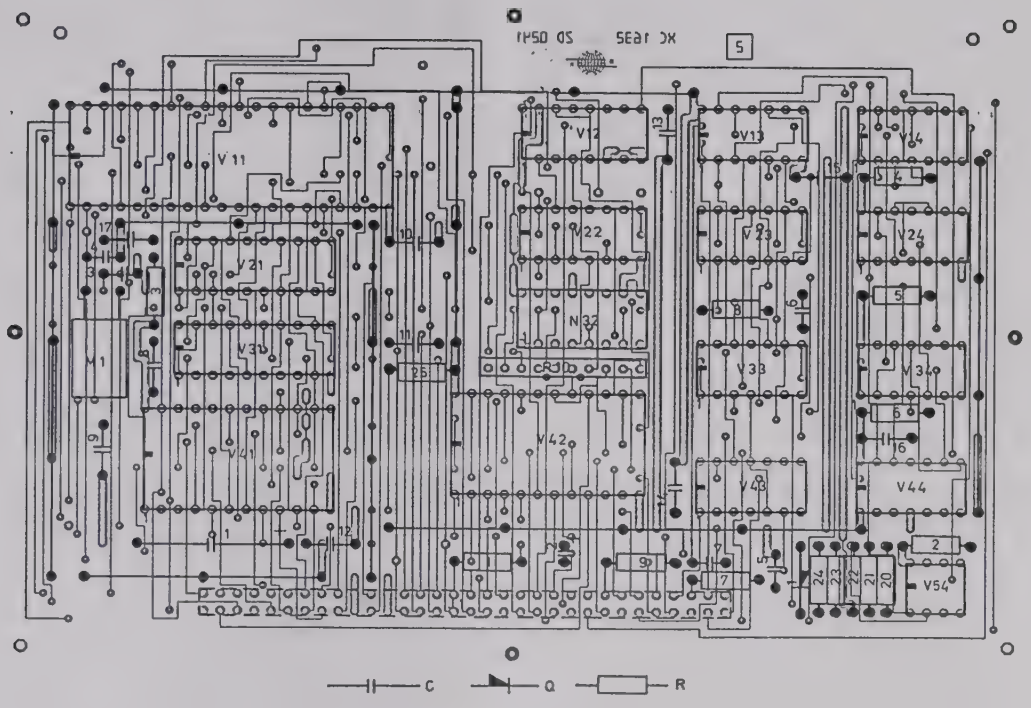


Viewed from the component side

Note: Add 600 to all position numbers

C 1	Electrolytic		22 µF/ 10 V	CE 0203
C 2	Polystyrene	1%	68 pF/630 V	CT 1191
C 3	-	1%	270 pF/125 V	CT 1143
C 4,5	Ceramic		100 nF/ 16 V	CK 5103
C 6	Electrolytic		47 µF/ 10 V	CE 0204
C 7,8	Ceramic		100 nF/ 16 V	CK 5103
C 9, 10	Electrolytic		22 µF/ 10 V	CE 0203
J 1	16-pin Plug			JP 1604
J 2	64-pin Plug			JP 6400
P 1	Cermet		20 kΩ	PG 3211
P 2	-		50 kΩ	PG 3520
Q 1	Ze. 1N825		5,9-6,5 V/0,25 W	QV 1346
Q 2,3	- BZX79C5		4,8-5,4 V/0,25 W	QV 1339
Q 4	Si. 1N4148		75 V/75 mA	QV 0216
R 1	Metal	1/4 W	1% 750 kΩ	RF 5750
R 2	-	-	- 40,2 kΩ	RF 4402
R 3	Carbon	-	5% 1,8 kΩ	RB 3180
R 4	Metal	-	1% 1,58 kΩ	RF 3158
R 5, 6	Carbon	-	5% 330 Ω	RB 2330
R 7	Carbon	1/4 W	5% 100 Ω	RB 2100
R 8	-	-	- 100 kΩ	RB 5100
R 9	-	-	- 1,0 kΩ	RB 3100
R 10	-	-	- 1,8 kΩ	RB 3180
R 11	-	-	- 1,0 kΩ	RB 3100
R 12	-	-	- 100 kΩ	RB 5100
R 13	Metal	1/4 W	1% 287 kΩ	RF 5287
R 14	Carbon	-	5% 1,0 MΩ	RB 6100
R 15	-	-	- 10 kΩ	RB 4100
R 16	-	-	- 22 kΩ	RB 4220
V 4	Silicon PNP			BC636 VB 0118
V 5	FET			U1899E VB 1063
V 11,12	I/O Expander for 8748			8243 VD 5011
V 13	Op. Amp.			LM316 VE 9998
V 21	I/O Expander for 8748			8243 VD 5011
V 22	A/D Converter			8704 VD 3010
V 31,32	6 × Buffer 3/S			HEF40097 VD 2047
	24-pin Socket			JJ 2407
	Printed Circuit Board			XC 1628


DC-Input
LIN3-
ADSTC
+5V
DGND
+18V
AGND
-18V
A/D Converter
8704
V22
ZERO ADJ.
GAIN ADJ.
LM316
V13
U1899E
V5
BC 636
V4
40097
V31
40097
V32
8243
V21
8243
V11
8243
V12
MSB
LSB
BUSY
OVLOT-
OVLIN-
ADLOW-
ADHIG-
VCCIO-
OA 20-
OA 30-
OA 40-
OA 50-
IAM30-
NC
OAO-
OA10-
IA 20-
IA 30-
IA 40-
IA 50-
IAM20-
IAM10-
IA 0-
IA 10-
POSPK-
MAXPK-
IMPUL-
AVFAS-
PRE-
DIR-
REF-
NEGPK-
CFIL-
BFIL-
AFIL-
DFIL-
RISE 2
RISE 1
DECAY 2
DECAY 1
NHR 2
NHR 1
LLOG 2
LLOG 1
FRONT
LPFIL-
HPFIL-
EXFIL-
AV3S-
AV10S-
AV30S-
AVREM-
AVSLO-
AV01S-
AV03S-
AV1S-
DBUS0
DBUS1
DBUS2
DBUS3
DBUS4
DBUS5
DBUS6
DBUS7
SLI01-
SLI02-
SLI03-
PRT23
PRT22
PRT21
PRT20
PROG
BC 636
U1899E
Bottom view
Add 600 to all pos. no.



Viewed from the component side

Note: Add 1000 to all position numbers

C 1	Electrolytic	100 µF/ 6,3 V	CE 0207
C 2	"	1 µF/ 63 V	CE 0540
C 3,4	Ceramic	18 pF/400 V	CK 1180
C 5-7	"	22 nF/ 32 V	CK 4222
C 8-17	"	100 nF/ 16 V	CK 5103
J 1	64-pin Plug		JP 6400
M 1	X-tal 4,8 MHz		MB 0011
N 32	Signature Switch		NN 0068
Q 1	Si. 1N4148	75 V/75 mA	QV 0216

R 1	Carbon	1/4 W	5%	470 Ω	RB 2470
R 2	"	"	"	100 kΩ	RB 5100
R 3-6	"	"	"	470 Ω	RB 2470
R 7-9	"	"	"	330 Ω	RB 2330
R 10	Thickfilm			9 × 10 kΩ	RZ 6410
R 20	Carbon	1/4 W	5%	100 kΩ	RB 5100
R 21	"	"	"	820 kΩ	RB 5820
R 22	"	"	"	270 kΩ	RB 5270
R 23	"	"	"	680 kΩ	RB 5680
R 24	"	"	"	10 kΩ	RB 4100
R 25				4,7 kΩ	RB 3470

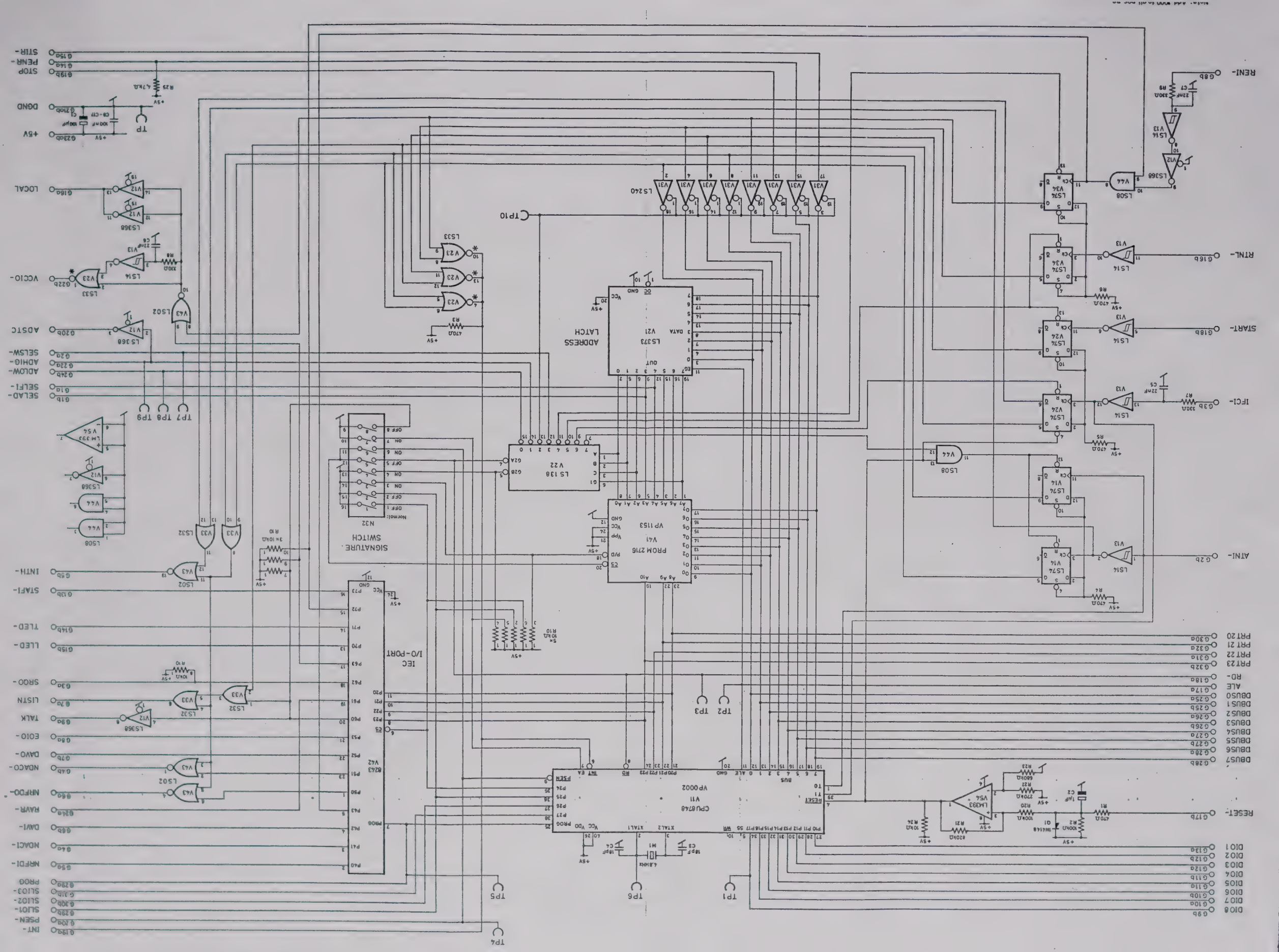
V 11	Single Chip Microcomputer	CPU8748	VP 0002
V 12	6 × Bus Driver	SN74LS368	VD 1073
V 13	6 × Schmitt-Trigger	SN74LS14	VD 1028
V 14	2 × D-Type Flip-Flop	SN74LS74	VD 1001
V 21	8 × Transparent Latch	SN74LS373	VD 1066
V 22	3-to-8-Line Decoder	SN74LS138	VD 1055
V 23	4 × 2 Inp. NOR Buffers/OC	SN74LS33	VD 1085
V 24	2 × D-Type Flip-Flop	SN74LS74	VD 1001
V 31	8 × Inverting Buffer	SN74LS240	VD 1060
V 33	4 × 2 Input OR Gate	SN74LS32	VD 1034
V 34	2 × D-Type Flip-Flop	SN74LS74	VD 1001
V 41	PROM	2716	VP 1153
V 42	I/O Expander for 8748	8243	VD 5011
V 43	4 × 2 Input NOR	SN74LS02	VD 1000
V 44	4 × 2 Input AND	SN74LS08	VD 1024
V 54	2 × Low Power Comparator	LM393	VE 0163

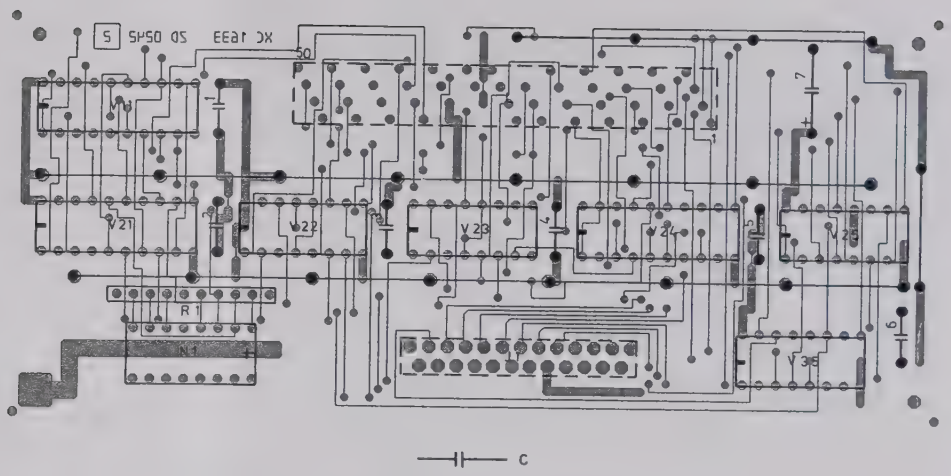
24-pin Socket	JJ 2407
40-pin Socket	JJ 4003
Printed Circuit Board	XC 1632

ZD 0241

6.81

2636 from serial no. 884041

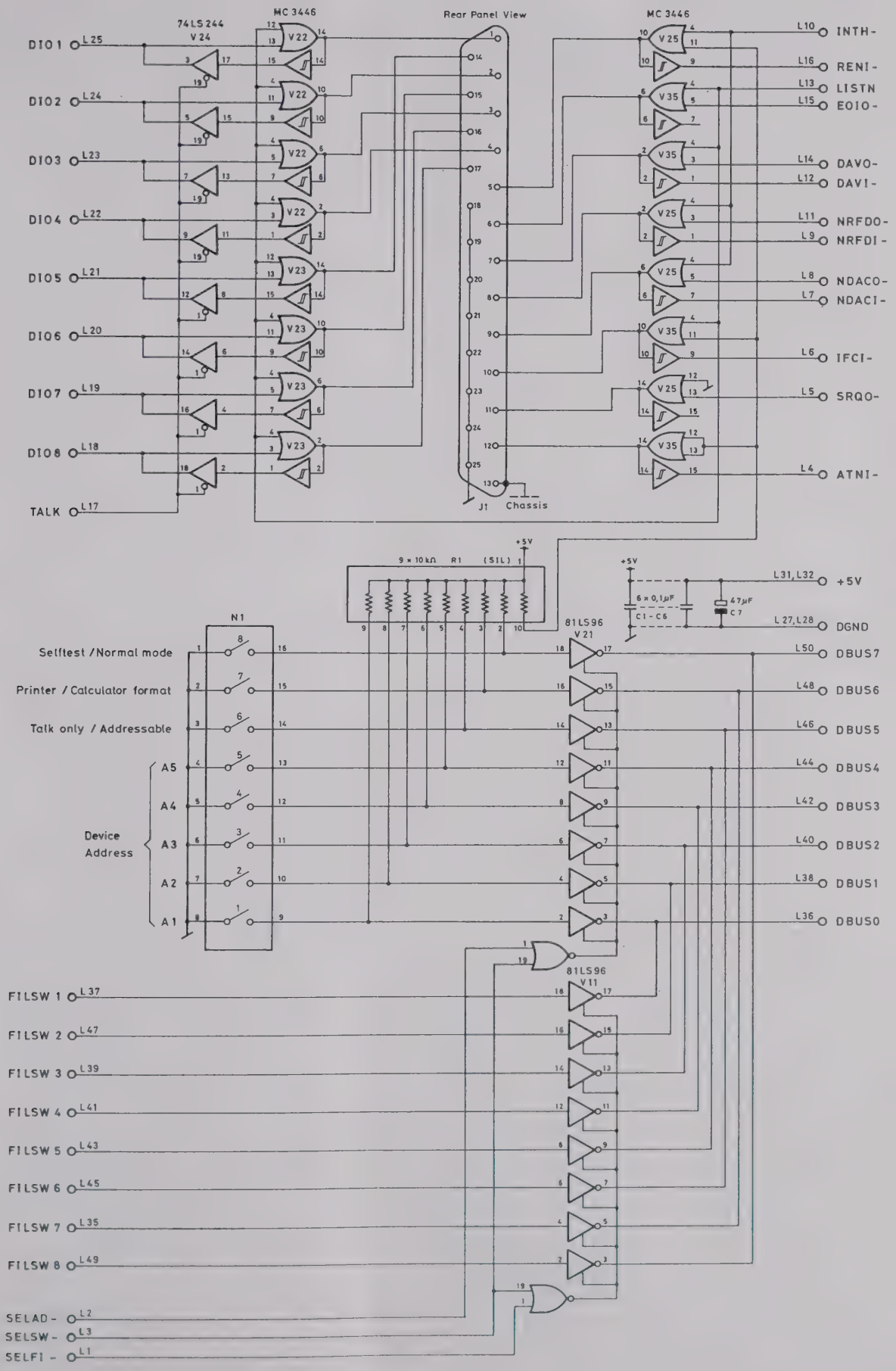

STBR-
PENR-
STOP
DGND
+5V
LOCAL
VCC10-
ADSTC
SELSW-
ADHIG-
ADLOW-
SELAD-
SELFI-
TP7 TP8 TP9
INTH-
STAFI-
TLED-
LLED-
SRQO-
LISTN
TALK
EOIO-
DAVO-
NDACO-
NRFDO-
RAVR-
DAVI-
NDACI-
NRFDI-
PROG
SLIO3-
SLIO2-
SLIO1-
PSEN-
INT-
SIGNATURE SWITCH
I/O-PORT
ADDRESS LATCH
PROM 2716
CPU8748
VP0002
LS 138
LS373
LS240
LS574
LS14
LS08
LS368
LS532
LS533
LS502
LM 393
RENI-
RTNL-
STARI-
IFCI-
ATNI-
RESET-
DIO1
DIO2
DIO3
DIO4
DIO5
DIO6
DIO7
DIO8
PRT20
PRT21
PRT22
PRT23
RD-
ALE
DBUS0
DBUS1
DBUS2
DBUS3
DBUS4
DBUS5
DBUS6
DBUS7
TP1
TP2
TP3
TP4
TP5
TP6
TP10



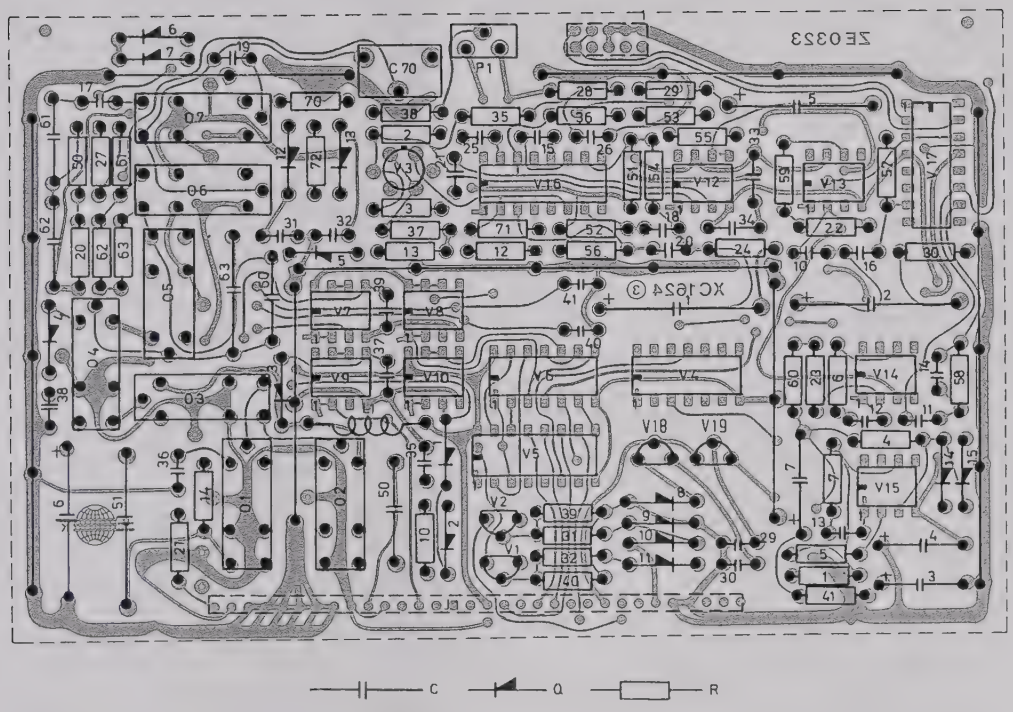
Viewed from the component side

Note: Add 1100 to all position numbers

C 1-6	Ceramic	100 nF/ 16 V	CK 5103
C 7	Electrolytic	47 µF/ 10 V	CE 0204
J 1	25-pin Plug		JP 2505
N 1	Switch, 8-pin		NN 0085
R 1	Thickfilm	9 × 10 kΩ	RZ 6410
V 11,21	8 × Buffers, 3-State	SN81LS96	VD 1086
V 22, 23	4 × Bus Transceiver	MC3446	VD 0095
V 24	8 × Inverting Buffer	SN74LS244	VD 1087
V 25,35	4 × Bus Transceiver	MC3446	VD 0095
	Flatcable with Plug		AY 5034
	16-pin Socket		JJ 1622
	Printed Circuit Board		XC 1633



Note: Add 1100 to all position numbers.



Viewed from the component side

PARTS LIST

Note: Add 200 to all position numbers

C 1,2	Electrolytic		470 µF/ 6.3 V	CE 0101
C 3,4	-		47 µF/ 25 V	CE 0491
C 5,6	-		220 µF/ 6.3 V	CE 0208
C 7	Tantalum		47 µF/ 6V	CF 0017
C 10,11	Ceramic		2.2 pF/400 V	CK 0220
C 12,13	-		3.9 pF/400 V	CK 0390
C 14	-		8.2 pF/400 V	CK 0820
C 15,16	-	5%	10 pF/400 V	CK 1100
C 17,18	-	5%	12 pF/400 V	CK 1120
C 19	-	5%	18 pF/400 V	CK 1180
C 20	-		68 pF/400 V	CK 1683
C 21	-		120 pF/400 V	CK 2122
C 25	-		1.5 nF/400 V	CK 3151
C 26	-		2.2 nF/400 V	CK 3221
C 29-32	-		10 nF/ 30 V	CK 4101
C 33,34	-		47 nF/ 30 V	CK 4470
C 35-37	-		47 nF/ 16 V	CK 4471
C 38	Electrolytic		6.8 µF/ 10 V	CE 0355
C 39-41	Ceramic		47 nF/ 16 V	CK 4471
C 50	Polycarbonate		470 nF/100 V	CS 0383
C 51	Polyester		470 nF/400 V	CS 0440
C 60	Polystyrene	1%	240 pF/500 V	CT 1142
C 61	-	1%	270 pF/125 V	CT 1143
C 62	-	1%	2.7 nF/ 63 V	CT 1158
C 63	-	1%	1.2 nF/500 V	CT 1308
C 70	Variable		5-65 pF	CV 0057
J 1	32-pin Plug			JP 3200
L 1	Coil		30 µH	LJ 0008
O 1-7	Relay			OC 0058
P 1	Cermet		50 kΩ	PG 3515
Q 1-11	Si.	1N4148	75 V/75 mA	QV 0216
Q 12,13	-	FDH300	150 V/200 mA	QV 0242
Q 14,15	-	1N4148	75 V/75 mA	QV 0216

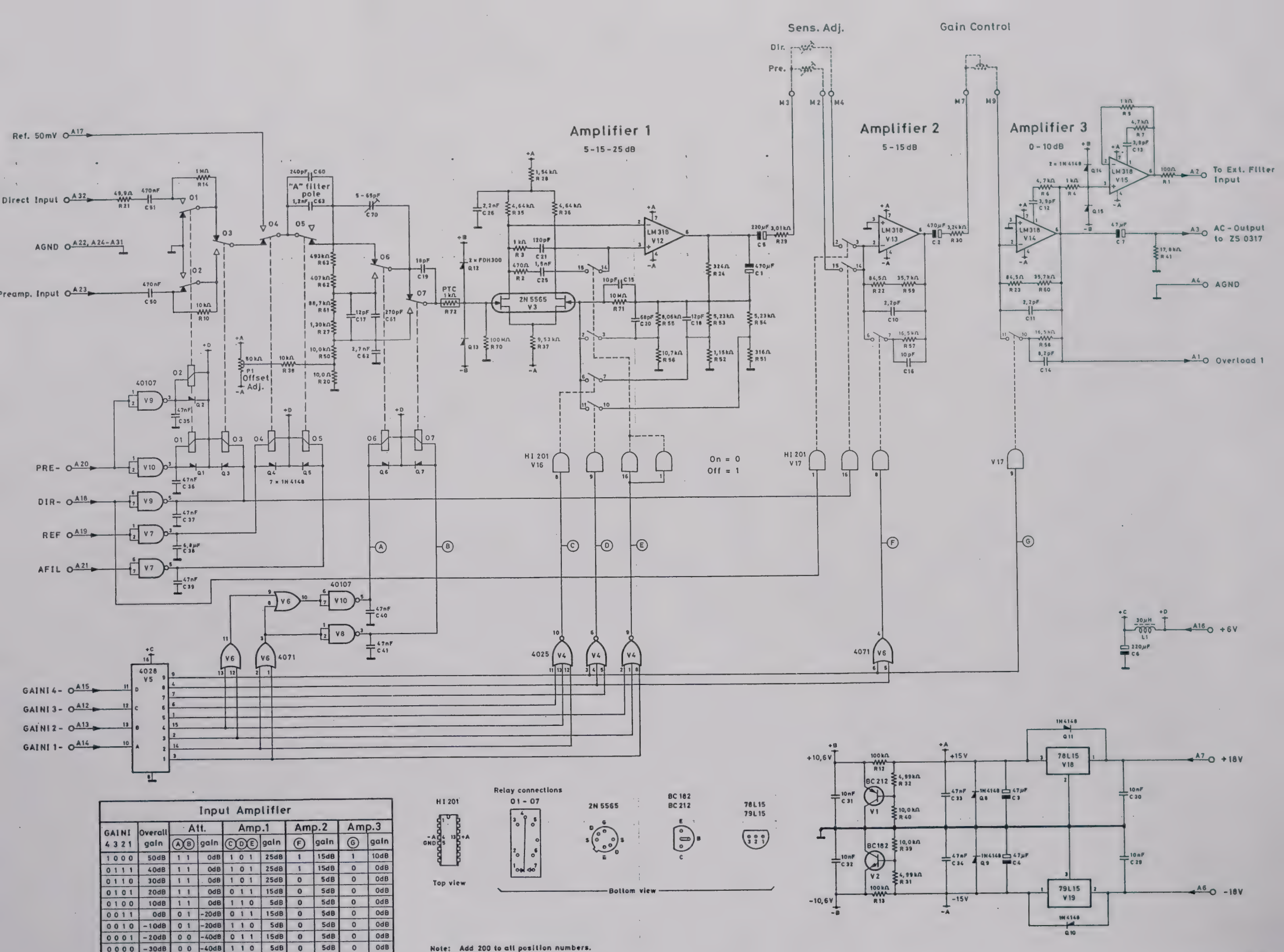
R 1	Carbon	1/4 W	5%	100 Ω	RB 2100
R 2	-	-	-	470 Ω	RB 2470
R 3-5	-	-	-	1.0 kΩ	RB 3100
R 6,7	-	-	-	4.7 kΩ	RB 3470
R 10	-	-	-	10 kΩ	RB 4100
R 12,13	-	-	-	100 kΩ	RB 5100
R 14	-	-	-	1.0 MΩ	RB 6100
R 20	Metal	-	1%	10.0 Ω	RF 1100
R 21	-	-	-	49.9 Ω	RF 1499
R 22,23	-	-	-	84.5 Ω	RF 1845
R 24	-	-	-	324 Ω	RF 2324
R 27	-	-	-	1.30 kΩ	RF 3130
R 28	-	-	-	1.54 kΩ	RF 3154
R 29	-	-	-	3.01 kΩ	RF 3301
R 30	-	-	-	3.24 kΩ	RF 3324
R 31,32	-	-	-	4.99 kΩ	RF 3499
R 35,36	-	-	-	4.64 kΩ	RF 3464
R 37	-	-	-	9.53 kΩ	RF 3953
R 38-40	-	-	-	10.0 kΩ	RF 4100
R 41	-	-	-	17.8 kΩ	RF 4178
R 50	-	-	0.1%	10.0 kΩ	RF 6042
R 51	-	-	-	316 Ω	RF 6046
R 52	-	-	-	1.15 kΩ	RF 6047
R 53,54	-	-	-	5.23 kΩ	RF 6049
R 55	-	-	-	8.06 kΩ	RF 6053
R 56	-	-	-	10.7 kΩ	RF 6054
R 57,58	-	-	-	16.5 kΩ	RF 6057
R 59,60	-	-	-	35.7 kΩ	RF 6060
R 61	-	-	-	88.7 kΩ	RF 6062
R 62	-	-	-	407 kΩ	RF 6063
R 63	-	-	-	493 kΩ	RF 6064
R 70	Carbon	1/8 W	20%	100 MΩ	RH 0901
R 71	-	-	10%	10 MΩ	RH 0902
R 72	PTC			1 kΩ	RN 0203

V 1	Silicon	PNP	BC212	VB 0049
V 2	-	NPN	BC182	VB 0055
V 3	FET		2N5565	VB 1084
V 4	3 x 3 Input NOR		CD4025	VD 2015
V 5	BCD-Dec /Bin. 8-Decoder		CD4028	VD 2017
V 6	4 x 2 Input OR Gate		CD4071	VD 2052
V 7-10	2 x 2 Input NAND Driver		CD40107	VD 2101
V 12-15	Op. Amp.		LM318N	VE 0083
V 16,17	4 x FET Switch		HI201	VE 0149
V 18	+15 V Voltage Regulator		78L15	VE 0188
V 19	-15 V Voltage Regulator		79L15	VE 0189

8-pin Socket	JJ 0817
10-pin Plug	IP 1012
Printed Circuit Board	XC 1624

Input Amplifier ZE 0323

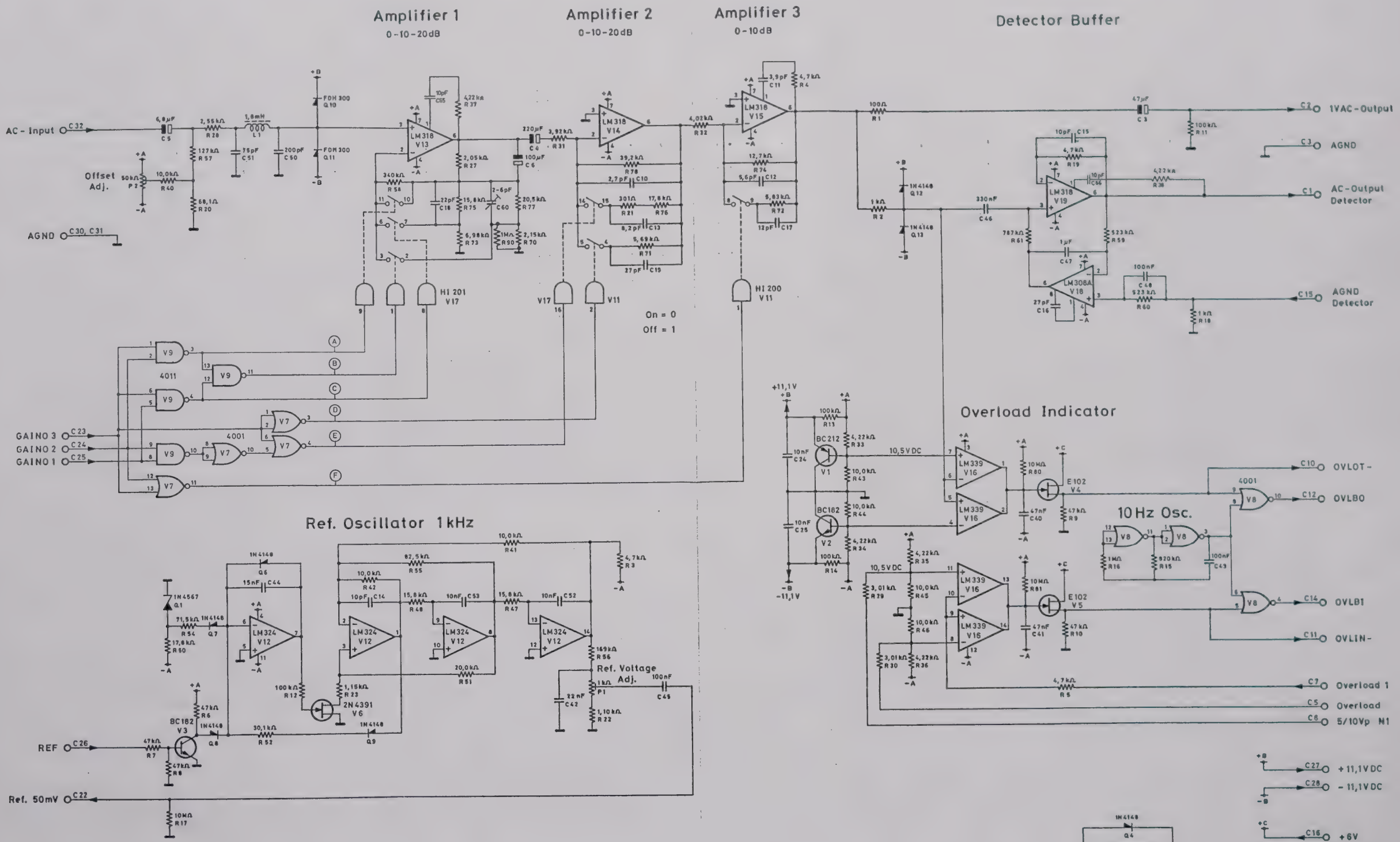
CIRCUIT DIAGRAM



Input Amplifier

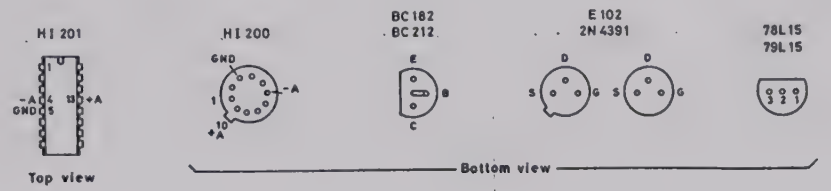
GAINI 4 3 2 1	Overall gain	Att. (A)(B)	Att. gain	Amp.1 (C)(D)(E)	Amp.1 gain	Amp.2 (F)	Amp.2 gain	Amp.3 (G)	Amp.3 gain
1 0 0 0	50dB	1 1	0dB	1 0 1	25dB	1	15dB	1	10dB
0 1 1 1	40dB	1 1	0dB	1 0 1	25dB	1	15dB	0	0dB
0 1 1 0	30dB	1 1	0dB	1 0 1	25dB	0	5dB	0	0dB
0 1 0 1	20dB	1 1	0dB	0 1 1	15dB	0	5dB	0	0dB
0 1 0 0	10dB	1 1	0dB	1 1 0	5dB	0	5dB	0	0dB
0 0 1 1	0dB	0 1	-20dB	0 1 1	15dB	0	5dB	0	0dB
0 0 1 0	-10dB	0 1	-20dB	1 1 0	5dB	0	5dB	0	0dB
0 0 0 1	-20dB	0 0	-40dB	0 1 1	15dB	0	5dB	0	0dB
0 0 0 0	-30dB	0 0	-40dB	1 1 0	5dB	0	5dB	0	0dB

Note: Add 200 to all position numbers.

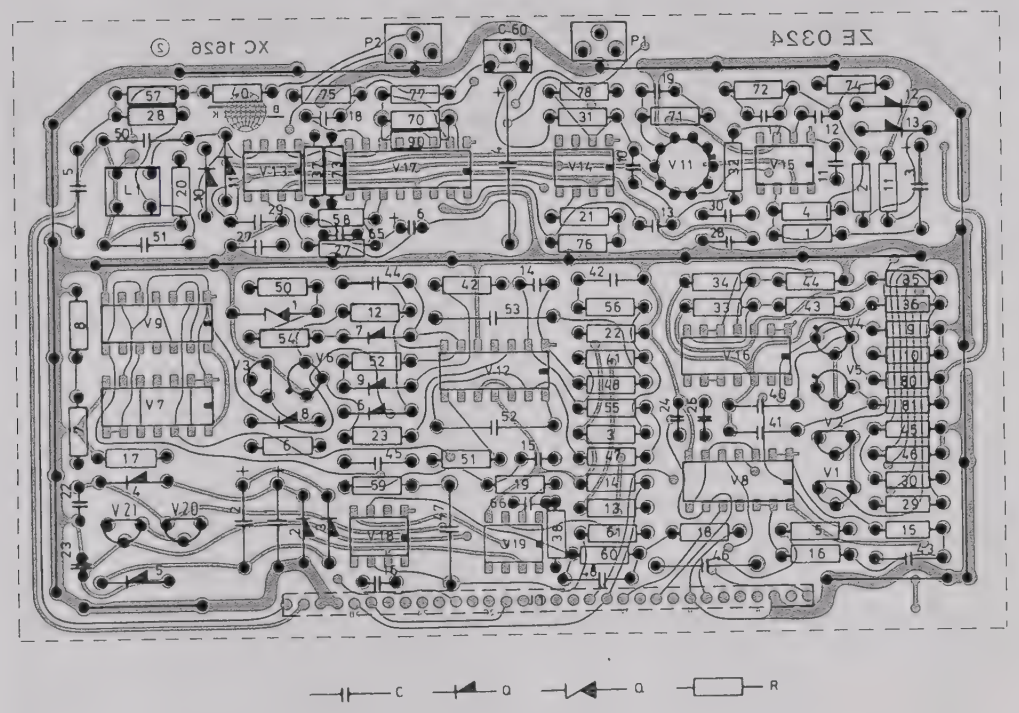


Output Amplifier

GAINO 3 2 1	Overall gain	Amp.1 Ⓐ Ⓑ Ⓒ	Amp.1 gain	Amp.2 Ⓓ Ⓔ	Amp.2 gain	Amp.3 Ⓕ	Amp.3 gain
1 1 0	0dB	0 1 1	0dB	0 0	0dB	0	0dB
1 0 1	10dB	1 1 0	10dB	0 0	0dB	0	0dB
1 0 0	20dB	1 0 1	20dB	0 0	0dB	0	0dB
0 1 1	30dB	1 0 1	20dB	1 0	10dB	0	0dB
0 1 0	40dB	1 0 1	20dB	1 1	20dB	0	0dB
0 0 1	50dB	1 0 1	20dB	1 1	20dB	1	10dB



Note: Add 400 to all position numbers.



Viewed from the component side

PARTS LIST

Note: Add 400 to all position numbers

C 1,2	Electrolytic			47 µF/ 25 V	CE 0491
C 3	-			47 µF/ 10 V	CE 0204
C 4	-			220 µF/ 6.3 V	CE 0208
C 5	Tantalum			6.8 µF/ 6 V	CF 0006
C 6	-			100 µF/ 3 V	CF 0019
C 10	Ceramic			2.7 pF/400 V	CK 0270
C 11	-			3.9 pF/400 V	CK 0390
C 12	-			5.6 pF/400 V	CK 0560
C 13	-			8.2 pF/400 V	CK 0820
C 14,15	-		5%	10 pF/400 V	CK 1100
C 16	-			27 pF/400 V	CK 1271
C 17	-		5%	12 pF/400 V	CK 1120
C 18	-		5%	22 pF/400 V	CK 1220
C 19	-		5%	27 pF/400 V	CK 1271
C 22	-			10 nF/ 30 V	CK 4101
C 23	Electrolytic			22 µF/ 25 V	CE 0352
C 24,25	Ceramic			10 nF/ 30 V	CK 4101
C 27-30	-			47 nF/ 30 V	CK 4470
C 40,41	Polyester			47 nF/250 V	CS 0434
C 42	-			22 nF/400 V	CS 0432
C 43	-			100 nF/250 V	CS 0436
C 44	-			15 nF/100 V	CS 0431
C 45	-			100 nF/250 V	CS 0436
C 46	Polycarbonate			330 nF/100 V	CS 0350
C 47	-			1 µF/100 V	CS 0384
C 48	Polyester			0.1 µF/250 V	CS 0436
C 50	Polystyrene		1%	220 pF/125 V	CT 1118
C 51	-		1%	75 pF/150 V	CT 1128
C 52,53	-		1%	10 nF/ 63 V	CT 1545
C 60	Variable			2.5-6 pF	CV 0050
C 65,66	Ceramic		5%	10 pF/400 V	CK 1100

J 1	32-pin Plug	JP 3200

L 1	Coil 1.8 mH	LB 0940

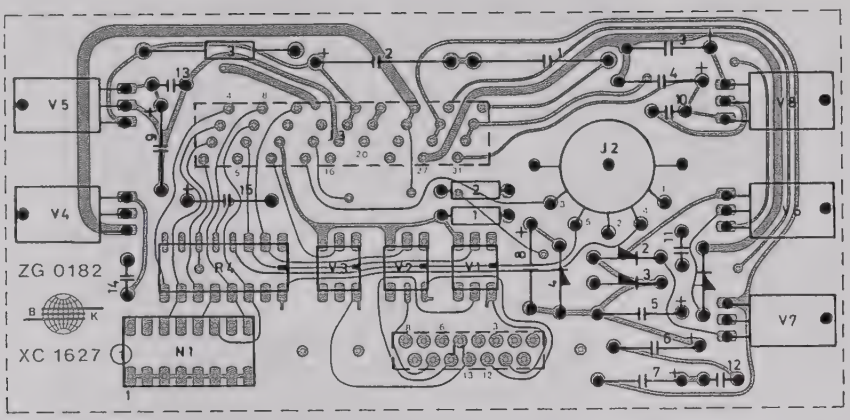
P 1	Cermet 1 kΩ	PG 2114
P 2	- 50 kΩ	PG 3515

Q 1	Ze.	1N4567	6.1-6.7 V/0.4 W	QV 0037
Q 2-9	Si.	1N4148	75 V/75 mA	QV 0216
Q 10,11	-	FDH300	150 V/200 mA	QV 0242
Q 12,13	-	1N4148	75 V/75 mA	QV 0216

R 1	Carbon	1/4 W	5%	100 Ω	RB 2100
R 2	-	-	-	1.0 kΩ	RB 3100
R 3-5	-	-	-	4.7 kΩ	RB 3470
R 6-10	-	-	-	47 kΩ	RB 4470
R 11-14	-	-	-	100 kΩ	RB 5100
R 15	-	-	-	820 kΩ	RB 5820
R 16	-	-	-	1 MΩ	RB 6100
R 17	-	1/8 W	10%	10 MΩ	RH 0902
R 18	Carbon	1/4 W	5%	1.0 kΩ	RB 3100
R 19	-	-	-	4.7 kΩ	RB 3470
R 20	Metal	-	1%	68.1 Ω	RF 1681
R 21	-	-	-	301 Ω	RF 2301
R 22	-	-	-	1.10 kΩ	RF 3110
R 23	-	-	-	1.15 kΩ	RF 3115
R 27	-	-	-	2.05 kΩ	RF 3205
R 28	-	-	-	2.55 kΩ	RF 3255
R 29,30	-	-	-	3.01 kΩ	RF 3301
R 31	-	-	-	3.92 kΩ	RF 3392
R 32	-	-	-	4.02 kΩ	RF 3402
R 33-38	-	-	-	4.22 kΩ	RF 3422
R 40-46	-	-	-	10.0 kΩ	RF 4100
R 47,48	-	-	-	15.8 kΩ	RF 4158
R 50	-	-	-	17.8 kΩ	RF 4178
R 51	-	-	-	20.0 kΩ	RF 4200
R 52	-	-	-	30.1 kΩ	RF 4301
R 54	-	-	-	71.5 kΩ	RF 4715
R 55	-	-	-	82.5 kΩ	RF 4825
R 56	-	-	-	169 kΩ	RF 5169
R 57	-	-	-	127 kΩ	RF 5127
R 58	-	-	-	340 kΩ	RF 5340
R 59,60	-	-	-	523 kΩ	RF 5523
R 61	-	-	-	787 kΩ	RF 5787
R 70	-	-	0.1%	2.15 kΩ	RF 6048
R 71	-	-	-	5.69 kΩ	RF 6050
R 72	-	-	-	5.83 kΩ	RF 6051
R 73	-	-	-	6.98 kΩ	RF 6052
R 74	-	-	-	12.7 kΩ	RF 6055
R 75	-	-	-	15.8 kΩ	RF 6056
R 76	-	-	-	17.8 kΩ	RF 6058
R 77	-	-	-	20.5 kΩ	RF 6059
R 78	-	-	-	39.2 kΩ	RF 6061
R 80,81	Carbon	1/8 W	10%	10 MΩ	RH 0902
R 90	-	1/4 W	5%	1 MΩ	RB 6100

V 1	Silicon	BC212	VB 0049
V 2,3	-	BC182	VB 0055
V 4,5	FET	E102	VB 1053
V 6	FET	2N4391	VB 1060
V 7,8	4 x 2 Input NOR	CD4001	VD 2000
V 9	4 x 2 Input NAND	CD4011	VD 2004
V 11	2 x Analog Switch	HI-200	VE 0070
V 12	Op. Amp.	LM324	VE 0074
V 13-15	- -	LM318N	VE 0083
V 16	Comparator	LM339	VE 0110
V 17	4 x Analog Switch	HI-201	VE 0149
V 18	Op. Amp	LM308AH	VE 0087
V 19	- -	LM318N	VE 0083
V 20	+15 V Voltage Regulator	78L15	VE 0188
V 21	-15 V Voltage Regulator	79L15	VE 0189

8-pin Socket	JJ 0817
14-pin Socket	JJ 1416
Printed Circuit Board	XC 1626



Viewed from the printed circuit side

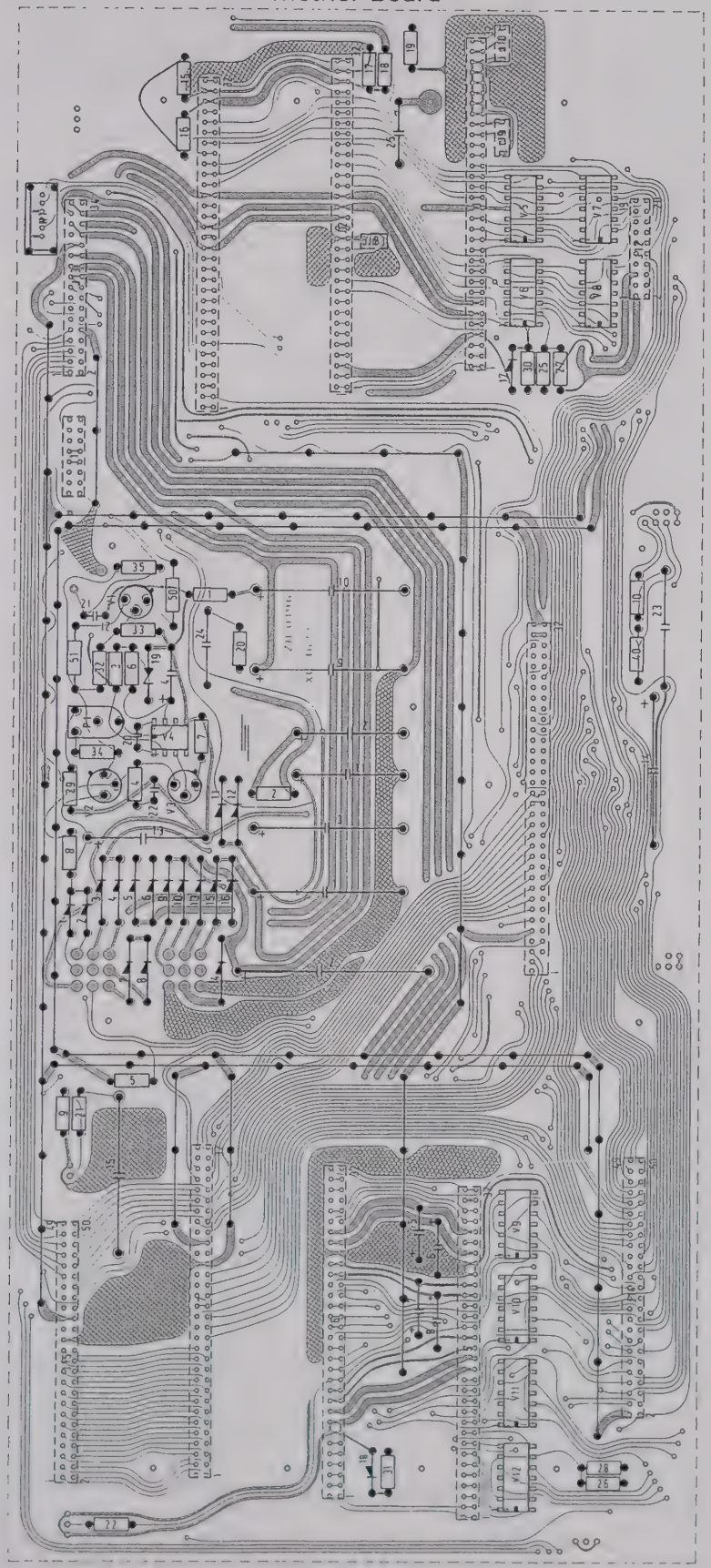
Note: Add 500 to all position numbers

C 1,2	Electrolytic		100 µF/ 16 V	CE 0310
C 3-9	-		4,7 µF/ 63 V	CE 0200
C 10-14	Ceramic		22 nF/ 32 V	CK 4222
C 15	Electrolytic		4,7 µF/ 63 V	CE 0200
J 1	15-pin Socket			JJ 1505
J 2	8-pin DIN Socket			JJ 0802
J 3	DIL Socket			JJ 1622
N 1	Filter Coding			NN 0085
Q 1-4	Si 1N4148		75 V/75 mA	QV 0216
R 1	Carbon	1/4 W 5%	100 Ω	RB 2100
R 2	-	- -	1,0 kΩ	RB 3100
R 3	Wire	4 W 10%	30 Ω	RX 0309
R 4	Thickfilm		8 × 47 kΩ	RZ 6447
V 1-3	Optically Coupled Isolator		TL114	VD 0093
V 4	Voltage Regulator		MC7805C	VE 0076
V 5	- -		MC7812C	VE 0123
V 6	- -		MC7818C	VE 0143
V 7	- -		MC7918C	VE 0144
V 8	- -		MC7806C	VE 0145
	Flatcable with Plug			AY 3424
	Printed Circuit Board			XC 1627

CIRCUIT DIAGRAM

See Interconnection Diagram 2636

Mother Board



Viewed from the printed circuit side

ZH 0196

PARTS LIST

C 1	Electrolytic	1000 µF/ 16 V	CE 0309
C 2	-	4700 µF/ 16 V	CE 0335
C 3	-	470 µF/ 25 V	CE 0468
C 4-8	-	10 µF/ 25 V	CE 0416
C 9,10	-	470 µF/ 40 V	CE 0417
C 11,12	-	22 µF/100 V	CE 0616
C 13	-	4,7 µF/350 V	CE 0708
C 14	-	22 µF/250 V	CE 0805
C 15	-	100 µF/ 63 V	CE 0537
C 20	Ceramic	68 pF/400 V	CK 1683
C 21,22	-	1 nF/400 V	CK 3101
C 23	Polycarbonate	220 nF/400 V	CS 0117
C 24	-	220 nF/100 V	CS 0339
C 25	-	2,2 µF/ 63 V	CS 0349

J 1-7	64-pin	Socket for Print	JJ 6400
J 8	3-pin	Angular Plug	JP 0323
J 9,10	4-pin	Angular Plug	JP 0413
J 11	16-pin	Plug	JP 1604
J 12	20-pin	Plug	JP 2012
J 13	34-pin	Plug	JP 3402
J 14,15	50-pin	Plug	JP 5005

N 1	Overload Switch		NN 0105

P 1	Cermet	2,2 kΩ	PG 2207

Q 1,2	Si	BYX10	1200 V/150 mA	QV 0025
Q 3-18	-	1N4004	400 V/1 A	QV 0237
Q 19	Ze	1N825	5,9-6,5 V/0,25 W	QV 1346

R 1,2	Carbon	1/4 W	5%	100 Ω	RB 2100
R 3	-	-	-	820 Ω	RB 2820
R 4,5	-	-	-	1,0 kΩ	RB 3100
R 6,7	-	-	-	5,6 kΩ	RB 3560
R 8,9	-	-	-	100 kΩ	RB 5100
R 10	-	-	-	1 MΩ	RB 6100
R 15-19	Metal	-	1%	4,99 Ω	RF 0499
R 20-22	-	-	-	49,9 Ω	RF 1499
R 25,26	-	-	-	1,62 kΩ	RF 3162
R 27,28	-	-	-	3,40 kΩ	RF 3340
R 29	-	-	-	5,23 kΩ	RF 3523
R 30, 31	-	-	-	2,49 kΩ	RF 3249
R 32	-	-	-	51,1 kΩ	RF 4511
R 33	-	-	-	154 kΩ	RF 5154
R 34	-	-	-	191 kΩ	RF 5191
R 35	-	-	-	649 kΩ	RF 5649
R 40	Carbon	0,15 W	10%	20 MΩ	RH 0002
R 50,51	-	1/3 W	5%	12,5 kΩ	

V 1-3	Silicon	BF258	VB 0552
V 4	Op Amp	LM301	VE 0017
V 5-12	4 × Op Amp	LM324	VE 0074

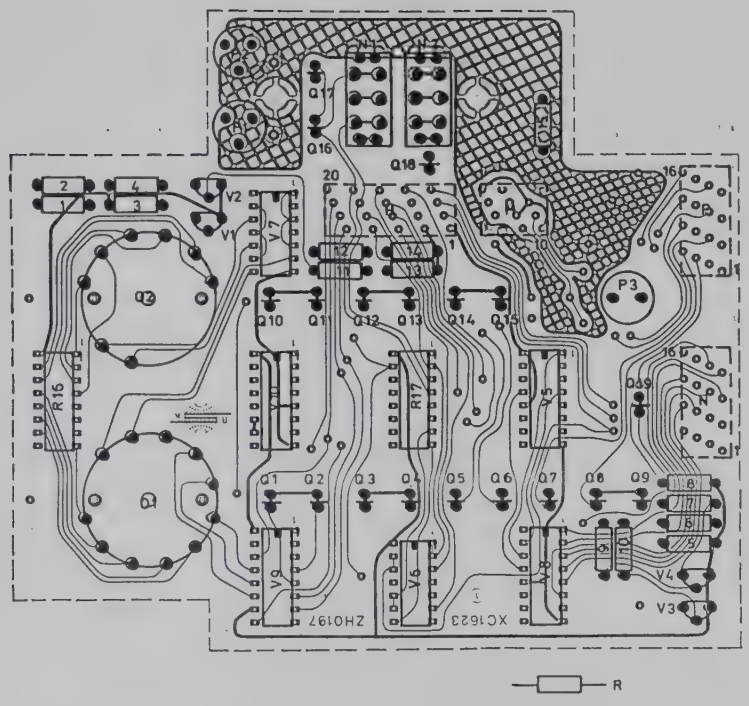
	Printed Circuit Board	XC 1622

CIRCUIT DIAGRAM

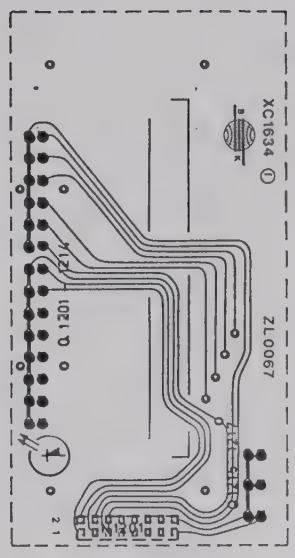
See Interconnection Diagram 2636

Amplifier Control

ZH 0197



Viewed from the printed circuit side



Viewed from the printed circuit side

Note: Add 100 to all position numbers

N 1	INPUT Switch			NN 0089
N 2	REF. Switch			NN 0089
O 1	Switch Mecanism			OD 1073
	Wafer for O1			OD 1074
O 2	Switch Mecanism			OD 1071
	Wafer for O2			OD 1072
P 1,2	"Sens. Adj."		10 kΩ	PD 3114
* P 3	"Input Gain"		8 kΩ	PS 2800
Q 1-19	LED			QV 4019
R 1-8	Carbon	1/4 W 5%	470 Ω	RB 2470
R 9,10	-	- -	10 kΩ	RB 4100
R 11-14	-	- -	15 kΩ	RB 4150
* R 15				
R 16,17	Thickfilm		15 × 10 kΩ	RZ 0048
V 1-4	Silicon PNP		BC212B	VB 0049
V 5	4 bit Binary Full Adder		SN74LS283	VD 1021
V 6	4 × 2 Input NAND Gate		SN74LS00	VD 1033
V 7	6 × Inverter O/C		SN74LS05	VD 1035
V 8	BCD-to Decimal Dec./Dr.		SN74LS145	VD 1037
V 9	10-4-line Encoder		SN74LS147	VD 1083
V 10	8-3-line Encoder		SN74LS148	VD 1041

* Matched set P3/R15 = 8 kΩ

10-pin Flatcable	AY 1054
16-pin Flatcable	AY 1609
16-pin Flatcable	AY 1649
20-pin Flatcable	AY 2035
Printed Circuit Board	XC 1623

Meter Circuit ZL 0067

Note: Add 1200 to all position numbers

N 1	16-pin Plug		JP 1604
Q 1-17	LED	OLR-102	QV 4003
	Cover for Lamp		DZ 9425
	Printed Circuit Board		XC 1634

OVLBO H7
OVLBI H6
LOCAL H8
+5V H1
DGND H5

BC 212 V2, BC 212 V1, BC 212 V4, BC 212 V3
15kΩ R11, 15kΩ R12, 15kΩ R13, 15kΩ R14, 470Ω R1, 470Ω R2, 10kΩ R16

Input Section Gain
74LS05 V7
O1: +50dB, +30dB, +10dB, -10dB, -30dB, +40dB, +20dB, 0dB, -20dB

IA50- IA40- IA30- IA20- IA10- IA0- IAM10- IAM20- IAM30- OA50- OA40- OA30- OA20- OA10- OA0- UNCAL-
P1 P16 P14 P12 P10 P8 P6 P4 P2 P15 P13 P11 P9 P7 P5 P3

-30dB Q9 Q8 Q7 Q6 Q5 Q4 Q3 Q2 Q1 +50dB
0dB Q15 Q14 Q13 Q12 Q11 Q10 +50dB

Output Section Gain
O2: 0dB, +20dB, +40dB, +10dB, +30dB, +50dB
74LS05 V7

74LS147 V9
15 x 10kΩ R17
74LS148 V10

GAIN O3 H11
GAIN O2 H12
GAIN O1 H10
GAIN I4 H19
GAIN I3 H18
GAIN I2 H17
GAIN I1 H20

74LS00 V6
LIN3- H9
LLOG1 H2
LLOG2 H3
LLOG3 H4

Sens. Adjust
M3, M2, M4
10kΩ P1 Preamp.
10kΩ P2 Direct

Gain Control
M7, M9
$R_{tot.}$ = 8kΩ
R_x R15
10kΩ P3

470Ω R8, 10kΩ R16, Q19
470Ω R4, 470Ω R3, Q16, Q17, Q18

Input Preamp. Direct N1
On Off N2
Reference
74LS05 V7
74LS00 V6

DIR- H15, PRE- H16, REF- H13, REF H14

74LS283 V5
74LS145 V8

ZL 0067
LIN Q17
LOG 30 Q16
LOG 60 Q15
+30dB Q8
+40dB Q7
+50dB Q6
+60dB Q5
+70dB Q4
+80dB Q3
+90dB Q2
+100dB Q1
-30dB Q14
-20dB Q13
-10dB Q12
0dB Q11
+10dB Q10
+20dB Q9

Add 1200 to all position numbers.

BC 212 (E, B, C) Bottom view

LED (C, A)

Note: Add 100 to all position numbers.
* Open Collector

BRÜEL & KJÆR
Nærum - Denmark

Detector and Filter Control ZH 0198

CIRCUIT DIAGRAM

Detector and Filter Control ZH 0198

CIRCUIT DIAGRAM

FILTERS

AVCON3 K23
AVCON2 K25
AVCON1 K22
AVREM- K45

NEG PK- K38
POS PK- K34
MAX PK- K37
IMPUL- K36

AV 30s- K46
AV 10s- K43
AV 3s- K44
AV 1s- K39
AV03s- K40
AV01s- K41
AVSLO- K42
AVFAS- K35

LS145 V22

LS147 V21

LS147 V31

VP1151 V23

LS05

74C914

C FIL- K14
B FIL- K19
A FIL- K18
D FIL- K30
LPFIL- K32
HPFIL- K27
EXFIL- K47

DETF 1 K28
DETF 2 K31
DETF 3 K24
DETF 4 K17
DETF 5 K11
DETF 6 K10

DETECTOR FUNKTION

1s 0,3s 0,1s Slow Fast Imp. Max. 3s 10s 30s Remote

TALK K3 TLED-
LISTEN K4 LLED-
SRQ K13 SRQO-
REMOTE

+5V K50
DGND K1

LOCAL K29

PEAK RISE
5 dB/µs 0,5 0,05

PEAK DECAY
Fast Slow Hold 0,55

DETECTOR OUTPUT
Normal Hold Reset

DETECTOR OUTPUT
Lin Log 30dB Log 60dB

INTERFACE
Reset Local

INTERFACE
Front Data

Cont. Stop Single

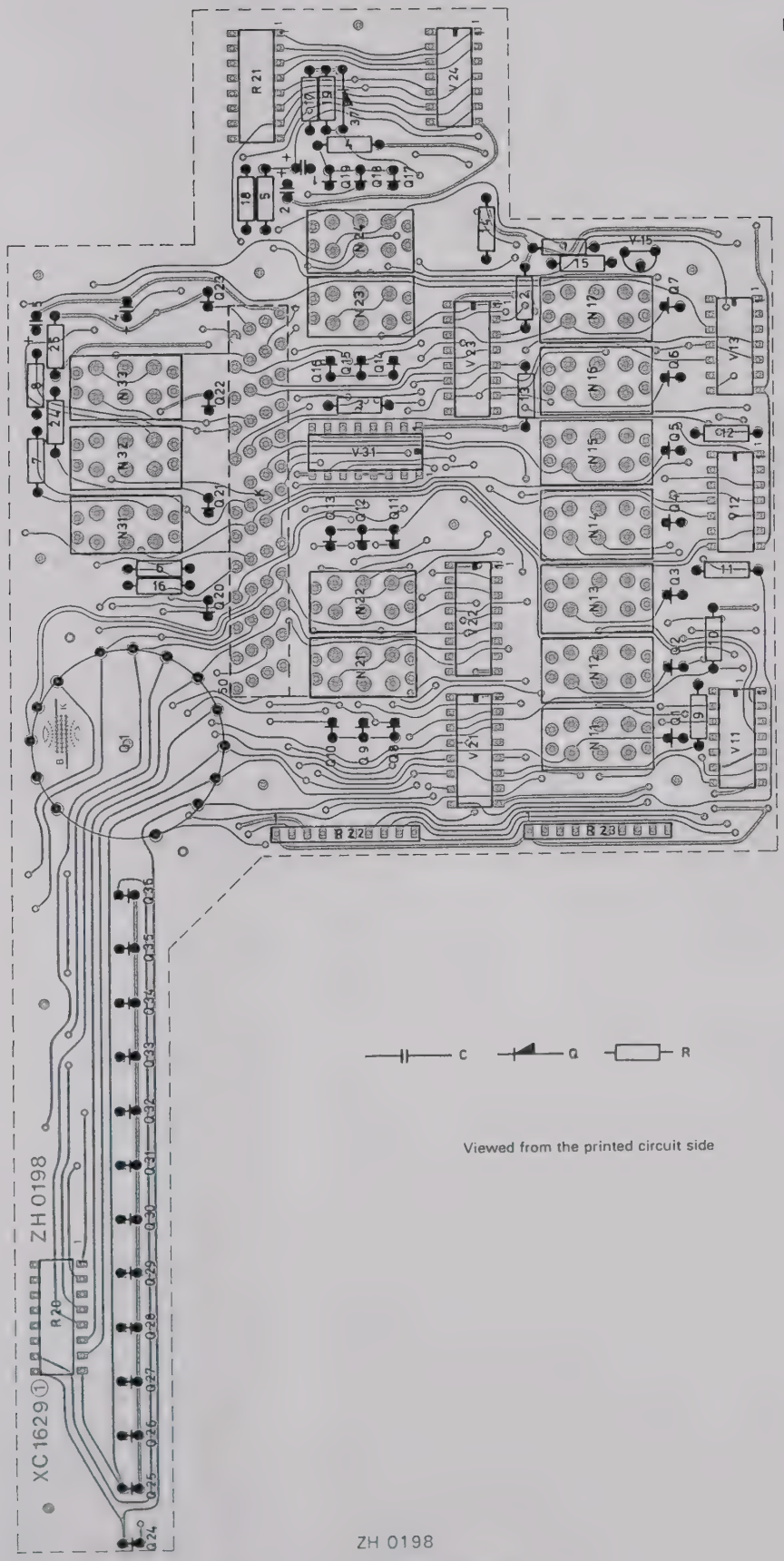
RISE 3 K12
RISE 1 K48
RISE 2 K49
DECAY 1 K21
DECAY 2 K20
NHR1 K8
NHR2 K9
LLOG 3 K6
LLOG 1 K5
LLOG 2 K2
RESET- K33
RTNL- K26
FRONT K7
STOP K15
START- K16

LED
BC 182

Note: Add 700 to all pos. no.

Detector and Filter Control

LAYOUT DIAGRAM



ZH 0198

PARTS LIST

Note: Add 700 to all position numbers

C 1	Tantalum	4,7 µF/ 35 V	CF 0051
C 2	-	22 µF/ 16 V	CF 0031
C 4,5	-	2,2 µF/ 20 V	CF 0022

N 11-17	FILTERS	NN 0089
N 21,22	PEAK	NN 0090
N 23	DETECTOR OUTPUT	NN 0092
N 24	DETECTOR OUTPUT	NN 0090
N 31	SYSTEM RESET, LOCAL	NN 0091
N 32	FRONT, DATA	NN 0089
N 33	READ OUT, CONT STOP, SINGLE	NN 0092

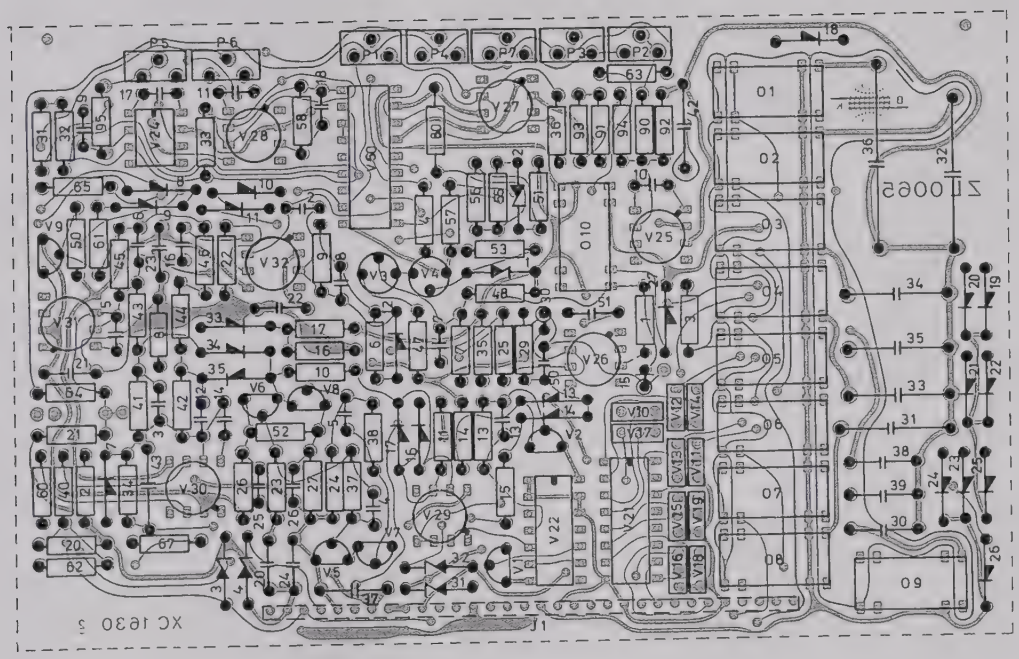
O 1	DETECTOR FUNCTION	OG 3006

Q 1-36	LED CQY85NB		QV 4019
Q 37	Si 1N4148	75 V/75 mA	QV 0216

R 1-8	Carbon	1/4 W	5%	470 Ω	RB 2470
R 9-17	-	-	-	10 kΩ	RB 4100
R 18	-	-	-	68 kΩ	RB 4680
R 19	-	-	-	100 kΩ	RB 5100
R 20,21	Thickfilm			10 kΩ	RZ 0048
R 22	-			470 Ω	RZ 6247
R 23	-			10 kΩ	RZ 6410
R 24,25	Carbon	1/4 W	5%	470 Ω	RB 2470

V 11	6 × Inverter O/C	SN74LS05	VD 1035
V 12	6 × Schmitt Trigger	SN74C14	VD 2033
V 13	6 × Inverter O/C	SN74LS05	VD 1035
V 15	Silicon NPN	BC182	VB 0055
V 21	10 to 4 line Encoder	SN74LS147	VD 1083
V 22	BCD-to Decimal Dec./Dr.	SN74LS145	VD 1037
V 23	PROM 32 × 8 O/C	5600	VP 1151
V 24	4 × 2 NAND Buffer O/C	SN74LS38	VD 1084
V 31	10 to 4-line Encoder	SN74LS147	VD 1083

Flatcable with Plug	AY 5034
Printed Circuit Board	XC 1629



Viewed from the component side

PARTS LIST

Note: Add 800 to all position numbers

C 2	Ceramic		4,7 pF/400 V	CK 0470
C 3-7	-		10 pF/400 V	CK 1100
C 8	-		18 pF/400 V	CK 1180
C 9-11	-		27 pF/400 V	CK 1271
C 12	-		33 pF/400 V	CK 1330
C 13	-		47 pF/400 V	CK 1471
C 14-16	-		150 pF/400 V	CK 2151
C 17	-		220 pF/400 V	CK 2222
C 18	-		2,2 nF/400 V	CK 3221
C 20-24	-		47 nF/ 32 V	CK 4470
C 25,26	-		47 nF/ 16 V	CK 4471
C 30	Polycarbonate		22 nF/400 V	CS 0132
C 31	-		82 nF/100 V	CS 0236
C 32	-		3,3 µF/100 V	CS 0347
C 33	-		330 nF/100 V	CS 0350
C 34	-		1 µF/100 V	CS 0384
C 35	-		680 nF/100 V	CS 0388
C 36	-		10 µF/ 63 V	CS 0399
C 37	Polyester		47 nF/250 V	CS 0434
C 38	Polycarbonate		100 nF/100 V	CS 0409
C 39	-		33 nF/250 V	CS 0419
C 42	Polystyrene	1%	1 nF/ 63 V	CT 1132
C 43	-	-	68 pF/630 V	CT 1191
C 50	Ceramic		27 pF/400 V	CK 1271
C 51	-		47 nF/ 32 V	CK 4470
J 1	32-pin Plug			JP 3200
P 1	Cermet		50 Ω	PG 0504
P 2	-		20 kΩ	PG 3209
P 3	-		50 kΩ	PG 3515
P 4	-		100 kΩ	PG 4112
P 5	-		50 kΩ	PG 3515
P 6	-		500 kΩ	PG 4511
P 7	-		1 MΩ	PG 5111
Q 1-4	Ze.	1N4567	6,1-6,7 V/0,4 W	QV 0037
Q 7-27	Si.	1N4148	75 V/75 mA	QV 0216
Q 31,32	Ze.	BZX79C3V3	3,1-3,5 V/0,25 W	QV 1361
Q 33	Si.		HP 5082-2835	QV 5001
Q 34,35	-		HP 5082-2302	QV 5008

R 1	Carbon	1/4 W	5%	47 Ω	RB 1470
R 2	-	-	-	330 Ω	RB 2330
R 3	-	-	-	1,0 kΩ	RB 3100
R 4	-	-	-	2,2 kΩ	RB 3220
R 6	-	-	-	4,7 kΩ	RB 3470
R 7	-	-	-	6,8 kΩ	RB 3680
R 8.9	-	-	-	10 kΩ	RB 4100
R 10.11	-	-	-	22 kΩ	RB 4220
R 13-15	-	-	-	27 kΩ	RB 4270
R 16	-	-	-	39 kΩ	RB 4390
R 17	-	-	-	1,5 MΩ	RB 6150
R 20-22	Metal	-	1%	100 Ω	RF 2100
R 23,24	-	-	-	110 Ω	RF 2110
R 25	-	-	-	499 Ω	RF 2499
R 26.27	-	-	-	845 Ω	RF 2845
R 29-32	-	1,8 W	0,1 %	1,00 kΩ	RF 0296
R 33	-	1/4 W	1%	1,00 kΩ	RF 3100
R 34	-	-	-	1,78 kΩ	RF 3178
R 35	-	-	-	2,80 kΩ	RF 3280
R 36	-	-	-	3,57 kΩ	RF 3357
R 37,38	-	-	-	4,01 kΩ	RF 3401
R 40	-	-	-	4,87 kΩ	RF 3487
R 41-46	-	-	-	4,99 kΩ	RF 6066
R 47	-	-	-	6,04 kΩ	RF 3604
R 48	-	-	-	6,34 kΩ	RF 3634
R 50	-	-	-	9,09 kΩ	RF 3909
R 51	-	-	-	14,3 kΩ	RF 4143
R 52	-	-	-	16,2 kΩ	RF 4162
R 53	-	-	-	17,4 kΩ	RF 4174
R 55	-	-	-	31,6 kΩ	RF 4316
R 56	-	-	-	32,4 kΩ	RF 4324
R 57	-	-	-	16,9 kΩ	RF 4169
R 58	-	-	-	49,9 kΩ	RF 4499
R 60,61	-	-	-	56,2 kΩ	RF 4562
R 62	-	-	-	127 kΩ	RF 5127
R 63	-	-	-	47,5 kΩ	RF 4475
R 64,65	-	-	-	316 kΩ	RF 5316
R 67	-	-	-	562 kΩ	RF 5562
R 80	-	-	-	22,6 MΩ	RH 0040
R 90-95	Selected with V50				

V 1,2	Silicon	PNP	BC212	VB 0049
V 3,4	-	-	BC179B	VB 0100
V 5,6	-	-	BF450	VB 0131
V 7-9	-	-	BF240	VB 0599
V 10-19	-	-	BC108BPS	VB 0592
V 21	BCD to Decm./Bin to 8-Dec.		CD4028	VD 2017
V 22	4 Exclusive OR		CD4070B	VD 2019
V 24	Op. Amp.		LM308N	VE 0046
V 25	- -		LM201A	VE 0084
V 26	- -		OP16E	VE 0177
V 27	- -		LF356H	VE 0147
V 28	- -		LM308AH	VE 0087
V 29	Voltage Comparator		LM308AH	VE 0171
V 30-32	Op. Amp.		LM201AH	VE 0160
V 50	Thickfilm			ZE 0256

9-pin Socket	JJ 0910
Printed Circuit Board	XC 1630

BRÜEL & KJÆR
Nærum - Denmark

Detector I ZL 0065

CIRCUIT DIAGRAM

Rectifier

Log. Converter

Log.-Lin. Converter

Integrator

Peak Polarity Selector

Averaging Time Control

Input E32

Low Level Sym.

High Level Sym.

High Level RMS

Low Level RMS

DC Level (Lin.)

Lin. Offset

Lin. E19

Log. low E1

Log. high E2

DC Level (Log.)

Peak E17

AC log. E18

Reset E21

OSPK- E13

EGPK- E14

+18V E26

-18V E28

+15V E22

-15V E23

AGND E24, E25, E31

+6V E16

+6,4V E29

AGND E15

-6,4V E30

DETF4 E9

DETF3 E8

DETF2 E7

DETF1 E6

Imp.

Peak

Fast

Slow

0,1 s

0,3 s

1 s

3 s

10 s

30 s

LF 356 H
LM 308 AH
LM 306 H
LM 201 AH
OP 16 E

BC 179 B

BF 240
BF 450

BC 212

BC 108 BPS

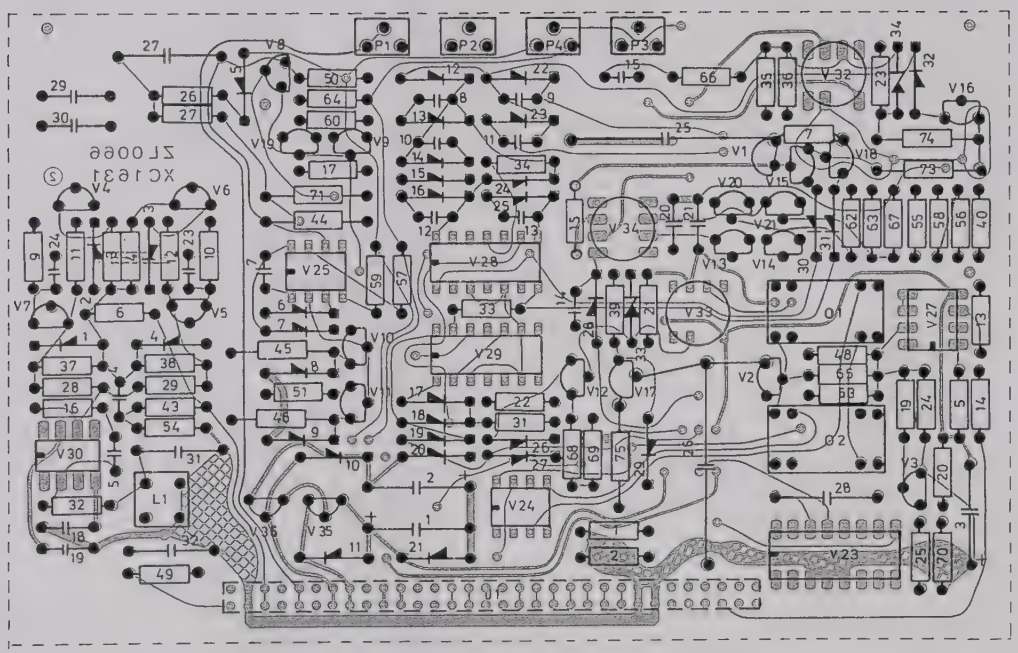
Relay Connections 01 - 010

Bottom view

Note: Add 800 to all position numbers.

* Selected

LAYOUT DIAGRAM



Viewed from the component side

PARTS LIST

Note: Add 900 to all position numbers

C 1,2	Electrolytic		47 pF/ 25 V	CE 0491
C 3	-		22 µF/ 25 V	CE 2002
C 4	Ceramic		4.7 pF/400 V	CK 0470
C 5	-	5%	33 pF/400 V	CK 1330
C 7-14	-	5%	27 pF/400 V	CK 1271
C 15	-		2.2 nF/400 V	CK 3221
C 18-21	-		47 nF/ 32 V	CK 4470
C 23,24	-		47 nF/ 16 V	CK 4471
C 25,26	Polycarbonate		1 µF/100 V	CS 0336
C 27,28	-		0.47 µF/100 V	CS 0383
C 29,30	Polyester		0.1 µF/100 V	CS 0436
C 31	Polysterene	1%	200 pF/125 V	CT 1118
C 32	-	1%	270 pF/125 V	CT 1143
J 1	64-pin Plug			JP 6400
L 1	Coil		1,3 mH	LB 0925
O 1,2	Relay			OC 0072
P 1	Cermet		1 kΩ	PG 2114
P 2	-		2 kΩ	PG 2212
P 3	-		5 kΩ	PG 2520
P 4	-		200 kΩ	PG 4207
Q 1-32	Si 1N4148		75 V/75 mA	QV 0216
Q 33,34	Ze BZX79C6V2		6,1-6,3 V/0,25 W	QV 1372

R 1,2	Carbon	1/4 W	5%	1,0 Ω	RB 0100
R 3,4	-	-	-	33 Ω	RB 1330
R 5	-	-	-	47 Ω	RB 1470
R 6	-	-	-	100 Ω	RB 2100
R 7	-	-	-	220 Ω	RB 2220
R 9,10	-	-	-	120 Ω	RB 2120
R 11,12				470 Ω	RB 2470
R 13,14				1,0 kΩ	RB 3100
R 15	-	-	-	2,2 kΩ	RB 3220
R 16	-	-	-	4,7 kΩ	RB 3470
R 17	-	-	-	6,8 kΩ	RB 3680
R 19,20	-	-	-	10 kΩ	RB 4100
R 21	-	-	-	18 kΩ	RB 4180
R 22-24	-	-	-	22 kΩ	RB 4220
R 25	-	-	-	47 kΩ	RB 4470
R 26,27	-	-	-	56 kΩ	RB 4560
R 28,29	-	-	-	33 kΩ	RB 4330
R 31	-	-	-	100 kΩ	RB 5100
R 32				1,0 kΩ	RB 3100
R 33	-	-	-	120 kΩ	RB 5120
R 34-36	-	-	-	220 kΩ	RB 5220
R 37,38	-	-	-	330 kΩ	RB 5330
R 39,40	-	-	-	1 MΩ	RB 6100
R 43	Metal	1/4 W	1%	44,8 kΩ	RF 0029
R 44,45	-	-	0,1%	40,0 kΩ	RF 0279
R 46	-	-	-	57,3 kΩ	RF 0280
R 48	-	-	1%	402 Ω	RF 2402
R 49	-	-	-	1,78 kΩ	RF 3178
R 50	-	-	-	2,05 kΩ	RF 3205
R 51	-	-	-	2,67 kΩ	RF 3267
R 53	-	-	-	4,42 kΩ	RF 3442
R 54-56	-	-	-	4,99 kΩ	RF 3499
R 57	-	-	-	7,68 kΩ	RF 3768
R 58	-	-	-	7,87 kΩ	RF 3787
R 59	-	-	-	9,09 kΩ	RF 3909
R 60	-	-	-	9,76 kΩ	RF 3976
R 62,63	-	-	-	10,0 kΩ	RF 4100
R 64	-	-	-	30,9 kΩ	RF 4309
R 65	-	-	-	44,2 kΩ	RF 4442
R 66,67	-	-	-	49,9 kΩ	RF 4499
R 68	-	-	-	105 kΩ	RF 5105
R 69,70	-	-	-	1,00 MΩ	RF 6100
R 71	-	-	0,1%	10,0 kΩ	RF 6229
R 73	Carbon	-	5%	3,01 MΩ	RH 0038
R 74	-	-	-	18,2 MΩ	RH 0039
R 75	-	-	-	22,6 MΩ	RH 0040

V 1-3	Silicon	BC212	VB 0049
V 4,5	-	BF423	VB 0132
V 6,7	-	BF422	VB 0600
V 8-16	FET	U1899	VB 1063
V 17,18	- Selected	U1899	VB 1065
V 19-21	-	P1086	VB 1506
V 23	2 × Precision Monost Multiv	CD4538	VD 2097
V 24	2 × 2 Input NAND Driver	CD40107	VD 2101
V 25	Op Amp	LM301AN	VE 0017
V 27	Comparator	LM311N	VE 0054
V 28,29	Op Amp.	LM324N	VE 0074
V 30	-	LM318	VE 0083
V 32	-	LF355H	VE 0107
V 33	-	LF356H	VE 0147
V 34	-	LM201AH	VE 0160
V 35	+ 15 V Voltage Regulator	78L15	VE 0188
V 36	−15 V Voltage Regulator	79L15	VE 0189

Heatsink	DT 0075
14-pin Socket	JJ 1416
Printed Circuit Board	XC 1631

CIRCUIT DIAGRAM

Impulse Detector

Meter Amplifier

Recorder Amplifier

Peak Detector

F12ab DC-Output 5V FSD

F28ab

F31ab AGND

Full Scale Adj. 1kΩ P1

TP3

F29b +60V

F29a -60V

F32b AC-Output to ZL0065

F30ab AC-Output 5V FSD

F27b +6,4V

F27a -6,4V

F9ab +6V

F7ab, F8ab AGND

F25ab +18V

F22ab +15V

F23ab -15V

F26ab -18V

F32a AC-Input

F10ab Peak

TP2

Log. low F1a

Lin. F13ab

Log. high F1b

LLOG1 F18ab

LLOG2 F21a

DETF6 F20a

DETF5 F19ab

DECAY1 F20b

DECAY2 F21b

Ref. F15ab

NHR2 F17ab

Reset F14ab

Log. AC F11ab

RISE1 F16b

RISE2 F16a

DC Gain (Log.) 5kΩ P3

Peak Level 200kΩ P4

Zero Adj. 2kΩ P2

78L15 79L15

BC 212 BF 422 BF 423 P 1086 JF

U 1899 E

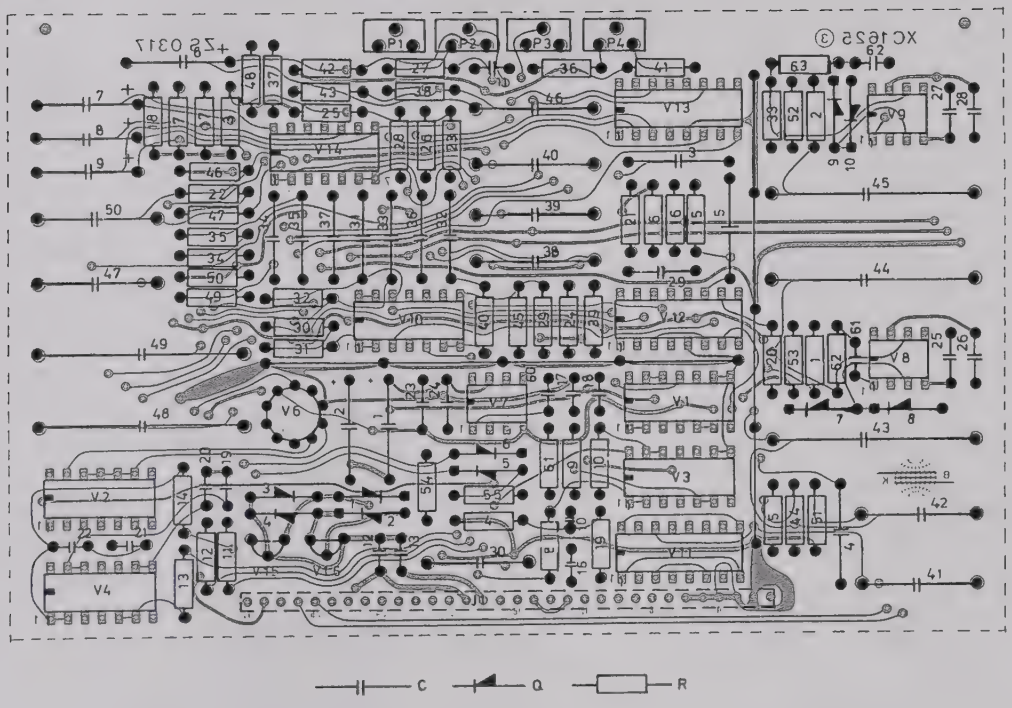
Relay Connections O1-O2

Bottom view

Note: Add 900 to all position numbers

Filter Circuit

LAYOUT DIAGRAM



Viewed from the component side

PARTS LIST

Note: Add 300 to all position numbers

C 1,2	Electrolytic		47 µF/25 V	CE 0491
C 3	-		47 µF/ 10 V	CE 0204
C 4-9	-		2,2 µF/ 63 V	CE 0401
C 10	Tantalum		33 µF/ 10 V	CF 0034
C 11	Ceramic		680 pF/400 V	CK 2682
C 12,13	-		10 nF/ 30 V	CK 4101
C 16-21	-		10 nF/ 30 V	CK 4101
C 23-28	-		47 nF/ 30 V	CK 4470
C 29	Polycarbonate		100 nF/100 V	CS 0409
C 30	-		1 µF/100 V	CS 0384
C 31	Polysterene 1%		300 pF/125 V	CT 1112
C 32	-	1%	2,2 nF/ 63 V	CT 1126
C 33	-	1%	2,4 nF/ 63 V	CT 1129
C 34,35	-	1%	1,0 nF/ 63 V	CT 1132
C 36	-	1%	220 pF/125 V	CT 1141
C 37	-	1%	1,5 nF/ 63 V	CT 1151
C 38	-	1%	5,6 nF/ 63 V	CT 1509
C 39	-	1%	6,2 nF/ 63 V	CT 1510
C 40	-	1%	6,8 nF/ 63 V	CT 1511
C 41,42	-	1%	36 nF/ 63 V	CT 1520
C 43-45	-	1%	120 nF/ 63 V	CT 1525
C 46	-	1%	24 nF/ 63 V	CT 1540
C 47	-	1%	39 nF/ 63 V	CT 1541
C 48,49	-	1%	100 nF/ 63 V	CT 1543
C 50	-	1%	13 nF/ 63 V	CT 1560
C 60-62	Ceramic		3,9 pF/400 V	CK 0390
J 1	32-pin Plug			JP 3200
P 1	Cermet		1 kΩ	PG 2114
P 2-4	-		5 kΩ	PG 2520
Q 1-4	Si.	1N4148	75 V/75 mA	QV 0216
Q 5-10	-	FDH300	150 V/200 mA	QV 0242

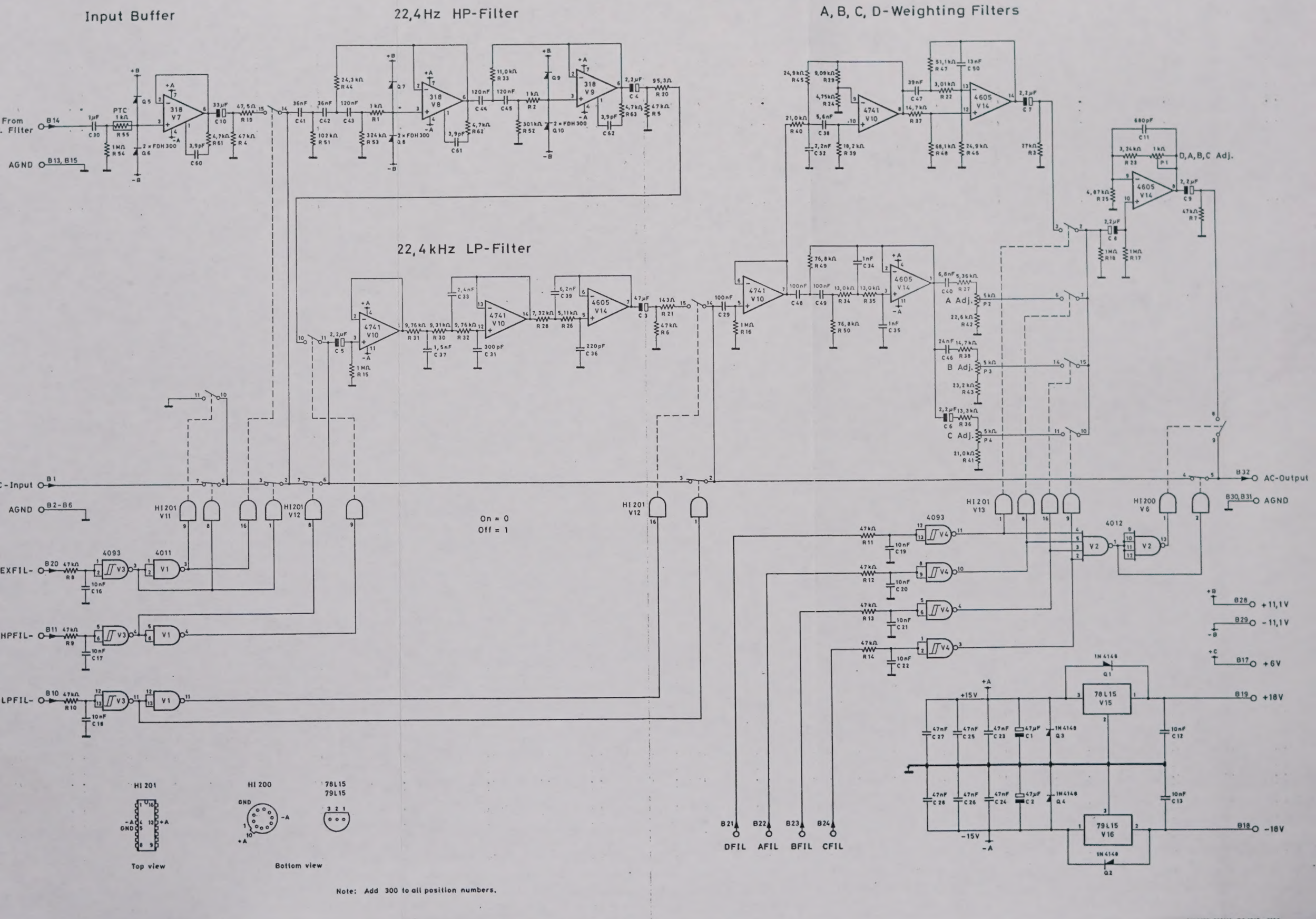
R 1.2	Carbon	1/4 W	5%	1,0 kΩ	RB 3100
R 3	-	-	-	27 kΩ	RB 4270
R 4-14	-	-	-	47 kΩ	RB 4470
R 15-18	-	-	-	1 MΩ	RB 6100
R 19	Metal	-	1%	47,5 Ω	RF 1475
R 20	-	-	-	95,3 Ω	RF 1953
R 21	-	-	-	143 Ω	RF 2143
R 22	-	-	-	3,01 kΩ	RF 3301
R 23	-	-	-	3,24 kΩ	RF 3324
R 24	-	-	-	4,75 kΩ	RF 3475
R 25	-	-	-	4,87 kΩ	RF 3487
R 26	-	-	-	5,11 kΩ	RF 3511
R 27	-	-	-	5,36 kΩ	RF 3536
R 28	-	-	-	7,32 kΩ	RF 3732
R 29	-	-	-	9,09 kΩ	RF 3909
R 30	-	-	-	9,31 kΩ	RF 3931
R 31.32	-	-	-	9,76 kΩ	RF 3976
R 33	-	-	-	11,0 kΩ	RF 4110
R 34.35	-	-	-	13,0 kΩ	RF 4130
R 36	-	-	-	13,3 kΩ	RF 4133
R 37,38	-	-	-	14,7 kΩ	RF 4147
R 39	-	-	-	18,2 kΩ	RF 4182
R 40,41	-	-	-	21,0 kΩ	RF 4210
R 42	-	-	-	22,6 kΩ	RF 4226
R 43	-	-	-	23,2 kΩ	RF 4232
R 44	-	-	-	24,3 kΩ	RF 4243
R 45.46	-	-	-	24,9 kΩ	RF 4249
R 47	-	-	-	51,1 kΩ	RF 4511
R 48	-	-	-	68,1 kΩ	RF 4681
R 49,50	-	-	-	76,8 kΩ	RF 4768
R 51	-	-	-	102 kΩ	RF 5102
R 52	-	-	-	301 kΩ	RF 5301
R 53	-	-	-	324 kΩ	RF 5324
R 54	-	-	-	1 MΩ	RF 6100
R 55	PTC			1 kΩ	RN 0203
R 61-63	Carbon	1/4 W	5%	4,7 kΩ	RB 3470

V 1	4 x 2 Input NAND	CD4011B	VD 2004
V 2	2 x 4 Input NAND	CD4012B	VD 2005
V 3,4	4 x 2 Input NAND Sch.trig.	CD4093B	VD 2081
V 6	2 x Analog Switch	HI200	VE 0070
V 7-9	Op. Amp.	LM318	VE 0083
V 10	Op. Amp.	HA4741-5	VE 0112
V 11-13	4 x Analog Switch	HI201	VE 0149
V 14	4 x Op. Amp.	HA4605-5	VE 0172
V 15	+ 15 V Voltage Regulator	78L15	VE 0188
V 16	−15 V Voltage Regulator	79L15	VE 0189
	14-pin Socket		JJ 1416
	Printed Circuit Board		XC 1625

BRÜEL & KJÆR
Nærum - Denmark

Filter Circuit ZS 0317

CIRCUIT DIAGRAM


Input Buffer
22,4Hz HP-Filter
A, B, C, D-Weighting Filters
22,4kHz LP-Filter
From Filter
B14
AGND
B13, B15
PTC
1kΩ
R55
1µF
C30
1MΩ
R54
2 x FDH 300
Q6
Q5
318 V7
3,9pF
C60
33µF
C10
4,7kΩ
R61
47kΩ
R4
47,5Ω
R19
36nF
C41
102kΩ
R51
36nF
C42
120nF
C43
324kΩ
R53
1kΩ
R1
24,3kΩ
R44
Q7
2 x FDH 300
Q8
318 V8
3,9pF
C61
4,7kΩ
R62
120nF
C44
120nF
C45
11,0kΩ
R33
1kΩ
R2
301kΩ
R52
Q9
2 x FDH 300
Q10
318 V9
3,9pF
C62
2,2µF
C4
4,7kΩ
R63
47kΩ
R5
95,3Ω
R20
24,9kΩ R45
9,09kΩ R29
4,75kΩ R24
21,0kΩ R40
5,6nF C38
2,2nF C32
18,2kΩ R39
4741 V10
39nF C47
14,7kΩ R37
51,1kΩ R47
13nF C50
3,01kΩ R22
68,1kΩ R48
24,9kΩ R46
4605 V14
2,2µF C7
27kΩ R3
680pF C11
3,24kΩ R23
1kΩ P1
D,A,B,C Adj.
4,87kΩ R25
2,2µF C9
47kΩ R7
2,2µF C8
1MΩ R18
1MΩ R17
4741 V10
2,2µF C5
1MΩ R15
9,76kΩ R31
9,31kΩ R30
9,76kΩ R32
2,4nF C33
1,5nF C37
300pF C31
7,32kΩ R28
5,11kΩ R26
6,2nF C39
220pF C36
4605 V14
47µF C3
143Ω R21
47kΩ R6
100nF C29
1MΩ R16
4741 V10
100nF C48
100nF C49
13,0kΩ R34
13,0kΩ R35
76,8kΩ R49
76,8kΩ R50
1nF C34
1nF C35
4605 V14
6,8nF C40
5,36kΩ R27
A Adj.
5kΩ P2
22,6kΩ R42
24nF C46
14,7kΩ R38
B Adj.
5kΩ P3
23,2kΩ R43
2,2µF C6
13,3kΩ R36
C Adj.
5kΩ P4
21,0kΩ R41
C-Input
B1
AGND
B2-B6
EXFIL-
B20
47kΩ R8
10nF C16
HPFIL-
B11
47kΩ R9
10nF C17
LPFIL-
B10
47kΩ R10
10nF C18
4093
4011
HI201 V11
HI201 V12
HI201 V12
On = 0
Off = 1
B32
AC-Output
B30,B31
AGND
HI201 V13
HI200 V6
4093
4012
47kΩ R11
10nF C19
47kΩ R12
10nF C20
47kΩ R13
10nF C21
47kΩ R14
10nF C22
+B
B28
+11,1V
-B
B29
-11,1V
+C
B17
+6V
1N4148 Q1
78L15 V15
B19
+18V
+15V
+A
47nF C27
47nF C25
47nF C23
47µF C1
1N4148 Q3
10nF C12
47nF C28
47nF C26
47nF C24
47µF C2
1N4148 Q4
10nF C13
79L15 V16
B18
-18V
-15V
-A
1N4148 Q2
B21
B22
B23
B24
DFIL
AFIL
BFIL
CFIL
HI 201
Top view
HI 200
Bottom view
78L15
79L15
Note: Add 300 to all position numbers.
1002172-820118 -ZS 0317 - 2636